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STEEL

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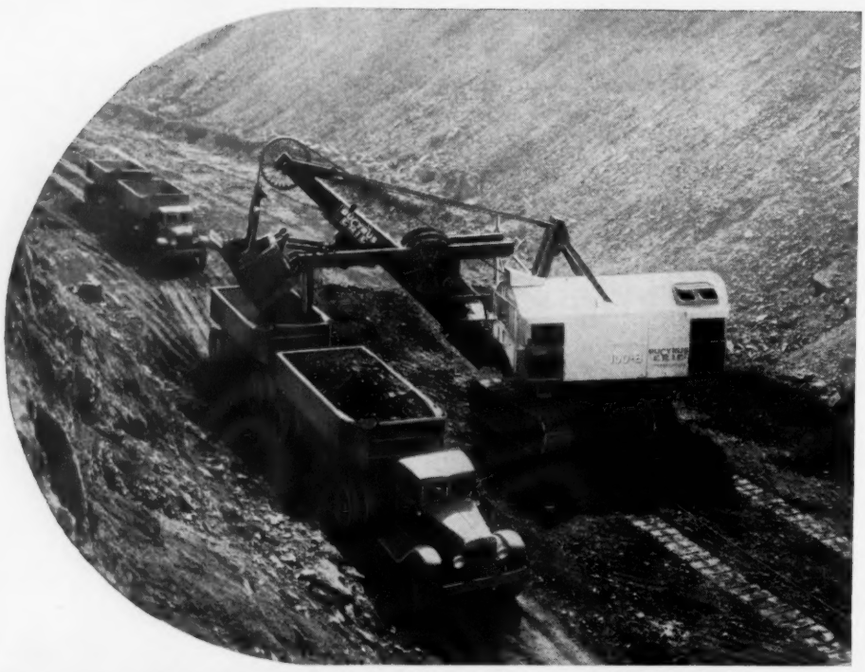
PRODUCTION · PROCESSING · DISTRIBUTION · USE

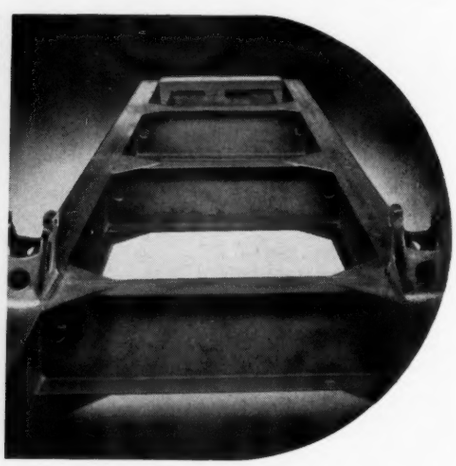
ALLOY NICKEL STEELS

Boost the PAYLOAD ... and CUT HAULAGE COSTS



40 TONS PER TRIP

Typical of the tremendous capacities that are being developed through the use of the Nickel alloy steels, are these trailer units which handle 40 tons of coal per trip in an Illinois strip mine. By employing strong, tough Nickel alloy steels, the manufacturer, Austin-Western Road Machinery Co. of Aurora, Ill., was able to develop giant trailers which have substantially reduced haulage costs. Weight of parts was materially reduced, without decreasing safety factor or dependability. Nickel alloy steels were used for the rear axles, spring shackle bolts, spring shackle shaft, spring clips, wheel studs, brake drum bolts, air cylinder valve stem, cross head and pivots.



WEIGHT REDUCED 25%–30%

Another striking example of high pay load capacities which the Nickel alloy steels make possible is this semi-trailer which carries a 20-ton load concentrated over a length of only 8 feet. The high strength-weight ratio of the Nickel alloy steels effected a saving of 25-30% in the weight of the frame as well as substantial weight savings in other highly stressed applications. Producer of this unit is Utility Trailer Manufacturing Co. of Los Angeles, using Nickel alloy steels obtained from Bethlehem Steel Co.

We invite consultation on the use of the Nickel alloy steels in your equipment.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

As the Editor Views the News

■ USE of the Walsh-Healey act by the department of labor as a club to force arbitrary increases in steel wage rates is regarded in all quarters (p. 13) as one of the most drastic controls yet saddled on industry by government. The new wage ruling fails to take into consideration the reasons for prevailing wage differentials. Many small producers say the new minimum scale discriminates against them and is likely to encourage further concentration of steel production in the large integrated companies. Producers already paying the minimum wages object to the ruling in principle, believing it unwise to freeze an arbitrary wage level by legislation. Delay in applying the ruling has been requested by eastern producers. A court test is a possibility.

• • •

1600 Presses In Plant

Ford Motor Co.'s new press plant now is operating at near capacity. This new wonder of the industrial world (p. 25) houses 1600 presses and a wide variety of other equipment . . . Numerous innovations in copper and brass rolling practice (p. 18) feature the new straightline mill of Revere Copper & Brass Inc. at Rome, N. Y.; it has capacity for producing 2,000,000 pounds of flat-rolled products monthly . . . When Carnegie-Illinois Steel Corp. abandons an obsolete plant it assists the interested community in solving its rehabilitation problem; last week (p. 74) it deeded its obsolete property at Scottdale, Pa., to a civic association . . . SWOC, to replenish its lean treasury, may ask companies with which it has contracts (p. 18) for permission to collect union dues through shop stewards.

• • •

Steel Rate Eases

If a manufacturer builds a special purpose machine, and also makes the material to be used with that machine, may he legally insist that the party to whom he leases the machine must purchase the material from him, to the exclusion of similar material offered by competitors? That is the issue in a test case (p. 26) brought by the federal trade commission against Signode Steel Strapping Co., Chicago . . . Steel demand is slightly easier and production last week (p. 17) dropped ½-point to 51½ per cent of ingot capacity . . . The outlook in durable goods (p. 33) is the best in several years. Foundry equipment orders (p. 31) increased sharply in December for the second successive month . . . Bureau of mines (p. 26) has established a secondary metals section at Pittsburgh.

• • •

Increase Employment

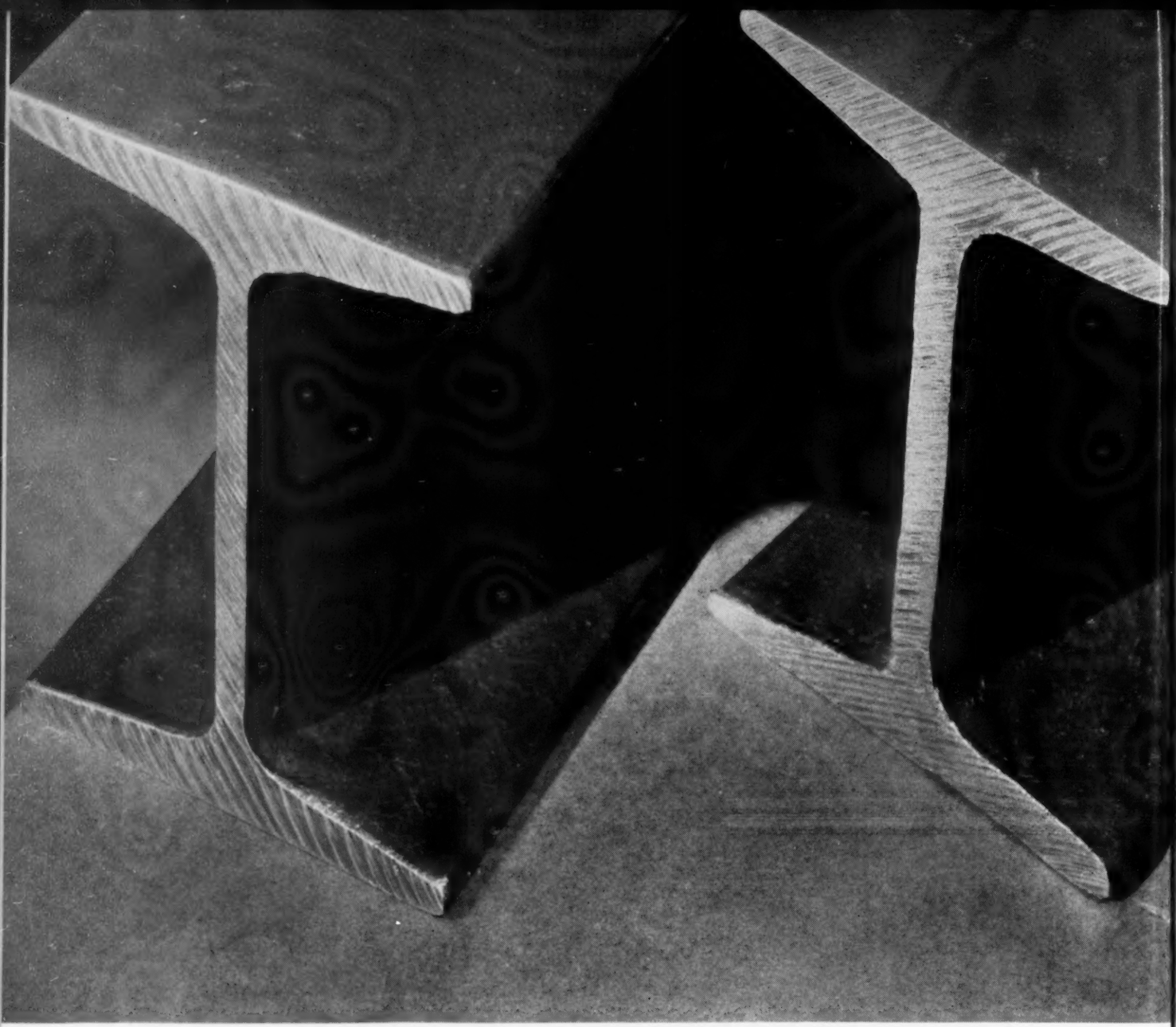
State unemployment compensation laws, according to an expert in this field (p. 36) are proving less onerous to industry than anticipated. Through adjustments of various kinds, many manufacturers have been able to stabilize employment. In many cases these adjustments have led to increased employment. . . . Two unusually large units have been shipped to Europe. One is a precision grinder (p. 38) with capacity for grinding work up to 36 inches in diameter and up to 480 inches long, without deflection. The other is a drop hammer 27 feet in height above the floor line (p. 41), to be used in forging airplane propellers and airplane engine crankcases. . . . Mechanical wear of metals (p. 43) now can be predicted by using a method involving electron-diffraction.

• • •

Protecting Finishes

Good results are obtained with radiant tube fired furnaces by dual control (p. 42). Tube temperature is maintained until the steel charge reaches its control point, at which time the control automatically is transferred to the charge. Experiments to apply such control to automatic combustion regulation are in process. . . . Increased use is being made of the new Unionmelt welding process (p. 48) which permits butt welds in 3-inch material in one pass and speeds up to 165 feet per hour with 3/16-inch plate. . . . A new temporary coating (p. 51) for protecting stainless steel and other highly finished surfaces against scratches during fabricating is applied by brush or spray gun. . . . A gasoline pump manufacturer (p. 46) enjoys benefits from a carefully worked out materials handling system.

E C Kreutzberg



Saving Weight and Fabrication Costs

THE many uses of structural steel in equipment as well as in building construction offer numerous opportunities for the services of the Inland engineer to prove of real value.

Weight often can be reduced without sacrifice of structural strength. Ease of handling and appeal to the buyer's critical eye can often be "stepped up."

The possibility of saving tonnage or fabrication cost leads to sale price and net profit considerations, so important in competitive markets.

Inland engineers offer broad experience in such problems that will aid your staff in securing the best possible results.

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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Peril to Industry Seen in Raising and "Freezing" of Wages by Government

■ MINIMUM steel wages for government contract work under the Walsh-Healey law, announced last week by the labor department, roused protest in many quarters.

To some producers, the department's edict means additional expense that may prevent them from competing for public work. This group includes many smaller, independent companies, particularly in the East, whose wage minimums are several cents below those specified.

Other producers who already are paying the minimum rates object to it on principle. They believe it unwise to "freeze" an arbitrary wage level into legislation. While the specified minimums may be unobjectionable now, they point out, a time may come when conditions would make impossible paying these rates.

In all quarters, the action was considered one of the most drastic controls yet perpetrated by government on private enterprise.

Provides Four Scales

The ruling, handed down by Charles V. McLaughlin, assistant secretary of labor, provides four wage minimums, ranging from 45 cents to 62½ cents an hour. The highest minimum, 62½ cents, was ordered for 17 states in the northeastern and middle western section where the bulk of the iron and steel industry is located. A 60-cent rate was provided for 11 western states; a 58½-cent rate for seven middle western states; and a 45-cent rate for 13 southern states. The edict becomes effective Jan. 31, and applies to government contracts exceeding $10,000.

Estimates of the number of steelworkers to be affected vary widely. The labor department's study, covering 313,064 workers, about two-thirds the industry's total, found "26,887 received minimum pay rates." Of these 26,887, it was estimated approximately 8000 would receive an immediate increase as result of the order.

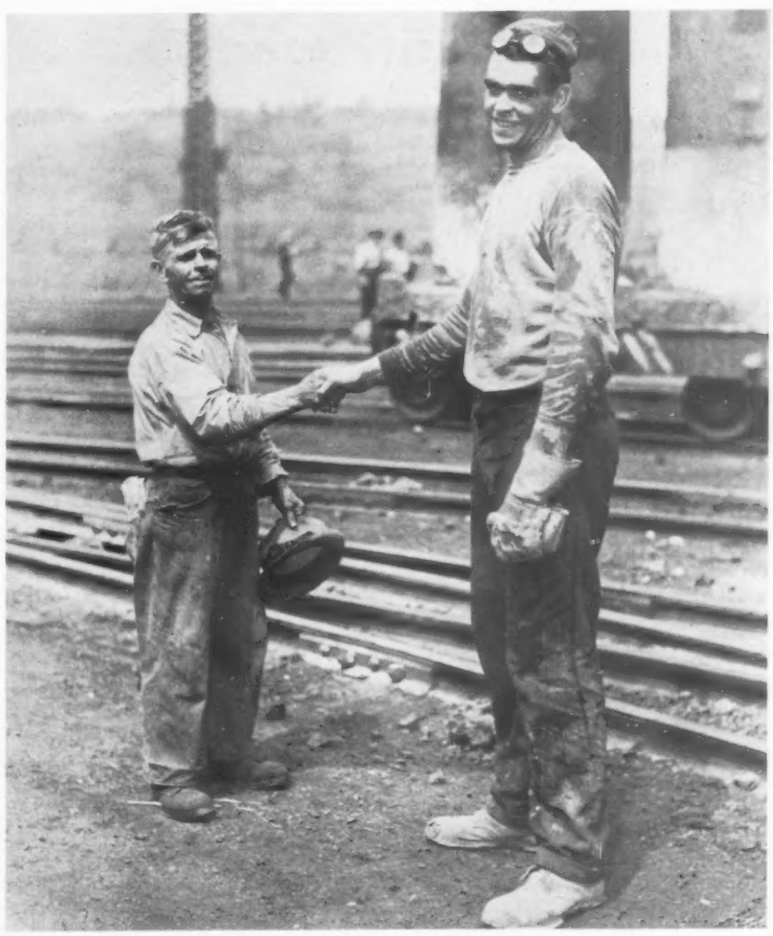
Higher estimates were made by Steel Workers Organizing committee officials. Harold Ruttenberg, SWOC research director, placed the figure at 90,000. He estimated 75,000 to 80,000 workers in the East are being paid under the minimum set by the decision, while about 10,000 receive less than 45 cents an hour in the southern states. Average wages exceed these minimums.

Possibility of a court test on the ruling was suggested last week, but at week's end no definite action had been taken.

Delay of at least two months in the ruling's application was requested of Secretary of Labor Frances Perkins by a group of nearly 50 eastern producers meeting in New York last week. Fearing their inability to compete with other sections, the eastern producers asked for time to study costs, possible adjustments, and the economic consequences of complying with the department's order.

That the proposed wage scale constitutes a serious menace to their

45 Cts. South, 62½ North: "The Long and Short of It"



■ BUT, not according to length or breadth or strength of workers—nor yet to other and still more important differentials—has the department of labor established zones and minimum steel wages, as shown on the map, p. 15

business was stated by the producers, who generally agree with a statement issued by Robert W. Wolcott, president, Lukens Steel Co., Coatesville, Pa. Mr. Wolcott said:

"The recent decision by the department of labor in raising and fixing minimum wages for the steel industry in the eastern area in connection with federal contracts, not only means an additional burden on a large number of small steel companies, but the action appears to have been taken without consideration of the factors which justify the present differential existing between such areas and which have been recognized in other areas. Study of the newly fixed rates definitely indicates discrimination against the eastern area and the many small producers located therein.

"It is certainly not in accord with the sentiment many times expressed by administration leaders and members of the Democratic party in regard to protecting rights and the encouragement of small business. Its evolution will be to concentrate the production of steel in the hands of the larger integrated companies in certain definite areas at the expense and life of the smaller nonintegrated companies, as well as the smaller towns and cities now supported by the nonintegrated companies.

"It was definitely set forth at the hearing held in Washington before the public contracts board by a member of the house judiciary committee, which drafted the original bill, that the assumption of the right by the secretary of labor as is indicated by this recent ruling was neither contemplated by congress nor intended in Walsh-Healey act."

Many Paid Less

Although Mr. McLaughlin found the hourly wage rates promulgated by him are the "prevailing wage rates in the locality," the evidence in the record shows that many plants in each section have been paying less than the rates specified.

For example, Mr. McLaughlin's 19-page report sets forth data for 157 of the 268 plants in the eastern area. Eighty-six, he says, pay a minimum of 62½ cents. But, he continues, 38 plants pay less than 56 cents; 16 plants pay 56½ cents; 16 plants pay between 56½ and 62½ cents; one plant pays 63½ cents.

"Clearly," declares Mr. McLaughlin, "the minimum is 62½ cents."

Determining above-average rates to be "the prevailing wage"—and therefore the minimum for government contract work—will have the effect of boosting the general steel wage level, already at an all-time high.

Even the Steel Workers Organizing committee has not insisted on strict observance of the 62½-cent base rate provided in its contracts in all northern mills.

Higher wages in steel mills complying with the Walsh-Healey act provisions, it is believed, will tend to push up rates in other industries, not affected directly by the law. An employe in one manufacturing plant is unlikely to be satisfied with 55 cents an hour when his neighbor doing similar work in a steel mill is receiving 62½ cents.

Effect will be to start pressure, backed by both government and unions, to raise wage levels in all industries still higher.

It is also suggested that the smaller steel plants will be most severely affected. In some cases the additional expense would outweigh any benefit accruing from government orders. Some of these companies view the effect as preventing them from bidding on public work. The result, they argue, will be to throw all government contracts to the large integrated companies.

At Washington it is said that some of the companies already paying the minimum rates provided will benefit in bidding for government work, as the competitive advantage now enjoyed by companies paying a lower wage rate will be eliminated.

Voted Voluntary Cuts

Some smaller company spokesmen contend they are able to continue in business only because they are situated in small communities where living costs and labor rates are below those of the larger communities. These include, of course, the hand sheet and tin mills which would be unable to compete with the continuous mills were they to pay the same wage scale. Other small mills find the same difficulty in competing with the more modern equipment of the large mills.

In several of these, steelworkers recently have voted wage reductions for themselves that the company might continue to operate. In at least one, the employes voided a SWOC contract providing for a 62½-cent base wage.

Mr. McLaughlin's ruling dis-

"Iron and Steel Industry" Defined for Purposes of Walsh-Healey Contracts

■ THE iron and steel industry, for purposes of the Walsh-Healey act wage minimums, is defined by Charles V. McLaughlin, assistant secretary of labor, to include the business of producing and selling all or any of the following products:

Axles—rolled or forged.
Bale ties—single loop.
Bars—alloy steel, hot-rolled.
Bars—cold finished, carbon and alloy.
Bars — concrete reinforcing, straight lengths.
Bars, ingots, blooms and billets—iron.
Bars—merchant steel.
Bars—tool steel.
Ferromanganese and spiegeleisen.
Girder rails and splice bars therefor.
Ingots, blooms, billets and slabs—alloy or carbon.
Light rails—60 pounds or less per yard, and splice bars and angle bars therefor.
Standard tee rails of more than 60 pounds per yard, and angle bars and rail joints therefor, or any of such products.
Mechanical tubing.
Pig iron—foundry, high silicon silvery, malleable, open-hearth basic, bessemer and high silicon bessemer, low phosphorus.
Pipe—standard, line pipe and oil-country tubular products.
Plates.
Posts—fence and sign.
Railroad tie plates.
Railroad track spikes.
Sheet bars.
Sheets.
Skelp.
Steel sheet piling.
Strip steel—cold-rolled and hot-rolled.
Structural shapes.
Tubes—boiler.
Tube rounds.
Wheels—car, rolled steel.
Wire—drawn.
Wire hoops—twisted or welded.
Wire nails and staples, twisted barbless wire, barbed wire, twisted wire fence stays and wire fencing, except chain-link fencing.
Wire rods.
Wire—spring, telephone.

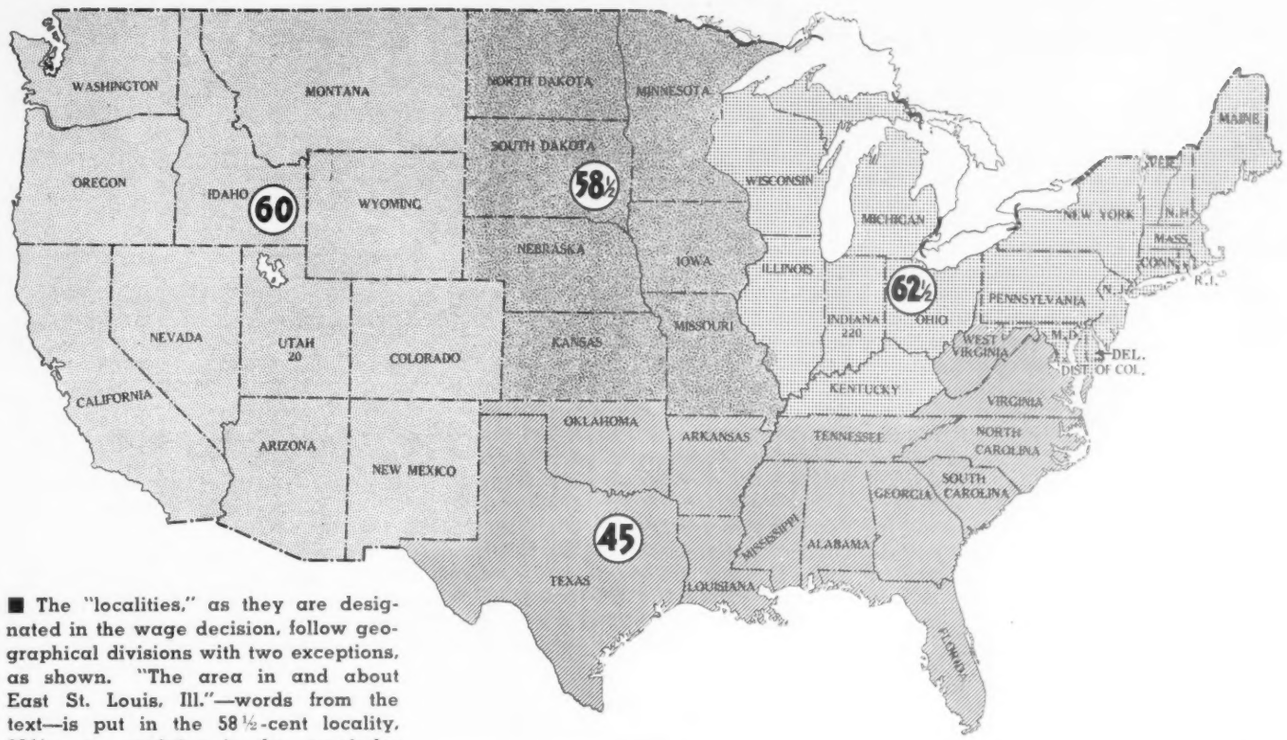
Tin plate, tin mill black plate and terne plate were excluded "because the government does not buy these products and because a different wage scale prevails in their production."

Mr. McLaughlin ruled experimental contracts were not within the scope of his decision. He said it appeared procurement of commodities obtained in this way will not be impaired.

This was to clarify a suggestion that small companies perform the bulk of work on experimental contracts and would be injured by the minimum wage requirements.

It was also suggested that while small companies depend on government business to only a minor degree certain kinds of steel specialties essential to the government are furnished chiefly by small companies. "If this be so," said Mr. McLaughlin, "an analysis will be made of the bidding in future contracts for specialties so that the machinery provided by section 6 may be called into operation upon a proper showing that the public interest would thereby be served."

As Assistant Labor Secretary Zones Country, Fixes Steel Wage Bases



■ **The "localities," as they are designated in the wage decision, follow geographical divisions with two exceptions, as shown. "The area in and about East St. Louis, Ill."—words from the text—is put in the 58½-cent locality, 62½-cents applying in the remainder of Illinois. The West Virginia "panhandle" is placed in the north's 62½-cent locality, while the remaining portion of the state in the southern, 45-cent, area**

◆

missed the argument that differentials based on population and size of plant be recognized, and defined "locality" as a broad geographic area. Construing locality to mean "city, town, village or other civil subdivision" would produce administrative problems of an almost insuperable character, he said. Such construction, he added, would predestine in most cases a finding that the prevailing minimum wages are the minimum wages actually being paid at each plant.

Educational orders by the war department, for which $2,000,000 per year has been appropriated and for which more money is proposed in a bill now before congress, would not be exempt, Washington officials intimated last week. Actually, no educational orders have yet been consummated.

It appears probable, however, that the war department will want to place some orders in small plants which may not be complying with all provisions of the Walsh-Healey act. Inasmuch as neither the Walsh-Healey act nor the congressional act authorizing the educational orders contains any exemption for such orders, complications may arise when the department places them.

While the extent of the law's application has not yet been clearly defined, Mr. McLaughlin accompanied his edict with a definition of the iron and steel industry, as set forth on the preceding page.

A public contracts board official told STEEL that the wage decision applies only to those "employes who engage in or are intimately connected with the manufacture, fabrication, assembly, handling, supervision or shipment" of the commodities listed.

Iron ore miners and employes on lake carriers or railroads bringing ore to furnaces are not affected.

The assistant labor secretary noted the practice whereby employes pay through the employer's disbursing office certain obligations. This practice he understood to be for the convenience of the employe and said that whether or not such practice contravenes the Walsh-Healey act's provisions can be decided only on full disclosure of all facts involved.

He suggested that where the practice exists, the company bidding for government work should submit a full statement to the administrator.

Production Lower; Labor Higher

■ STEEL wage minimums ordered by the labor department under the Walsh-Healey public contracts act are substantially higher than the average hourly labor cost for manufacturing industries in 1929, when national income and production were at an all-time peak.

Average wages in 1929, according to the United States census of manufactures, ranged to 22 cents an hour below the minimums the government now will attempt to enforce.

Also revealed by the census figures were wide differences in labor costs throughout the country—23 cents an hour in South Carolina to 61 cents in Wyoming and Montana.

How Walsh-Healey steel minimums compare with average manufacturing labor costs in 1929 is shown in the accompanying table.

	Walsh-Healey act minimum	Average labor cost in 1929,
Alabama	45	30
California	60	57
Colorado	60	51
Delaware	62½	45
Illinois	*62½	58
Indiana	62½	50
Kansas	58½	50
Kentucky	62½	42
Maryland	62½	..
Massachusetts	62½	49
Michigan	62½	60
Minnesota	58½	49
Missouri	58½	46
New Jersey	62½	54
New York	62½	60
Ohio	62½	57
Pennsylvania	62½	51
West Virginia	†45	49
Wisconsin	62½	49

*Except the area in and about East St. Louis, Ill., where the rate is 58½ cents. †Except Hancock, Brooke, Ohio, Harrison, Monongalia and Marshall counties where the rate is 62½ cents an hour.

District Steel Rates Show Little Effect Of Revised Basing Point System

■ WHAT effect has the revised basing point system in sale of steel products had on relative activity of various steelmaking districts?

Principal changes made in the system the middle of last year were the removal at certain centers of differentials over Pittsburgh base prices, and the establishment of new basing points for a number of products.

In theory the move gave indications of restricting the surrounding area from which a steelworks could derive its business. Also, theoretically, the Pittsburgh district was considered at the time to be the one to suffer most under the new setup, because the price differentials formerly charged by other producing centers gave Pittsburgh mills some leeway in freight absorption when venturing far afield for business.

At the same time, southern producers were accorded the best relative chance of profiting from the changed system, because their base prices previously carried the largest differentials over Pittsburgh. Elimination of these differentials supposedly would discourage northern producers from absorbing the substantial freight charges necessary for them to take business in the Birmingham and adjacent areas.

Data for steel plant operations the past six months provide no conclusive evidence that the new method of basing prices has brought about any marked variation in activity of different districts in comparison with competing centers. This, despite the fact that the accompanying chart, plotting the 1938 trend of steelmaking for the Pittsburgh, Chicago and Birmingham districts and that for the industry as a whole, indicates the Pittsburgh area lagged in the second-half recovery.

Transition Detrimental to Some

Despite the inference that revisions in the basing point system have had little effect on relative activity of various steelmaking centers, the transition has proved detrimental to some producers. Certain interests, most of them small, have seen part of their former markets destroyed under the new setup without obtaining compensating gains elsewhere. At the same time, others have found their market position more secure.

As shown by chart below, Pittsburgh and Chicago operations were at approximately the same level the first six months. Introduction of the new basing point system and the start of a rising business trend occurred almost simultaneously at mid-year. During the remaining six months the Chicago rate pulled ahead of Pittsburgh, although both districts lagged behind the national average. Second-half ingot production for the entire industry was 55 per cent larger than that of the first six months. In the Pittsburgh district, however, the gain for the second period was only 33 per cent, while Chicago had a 63.5 per cent increase.

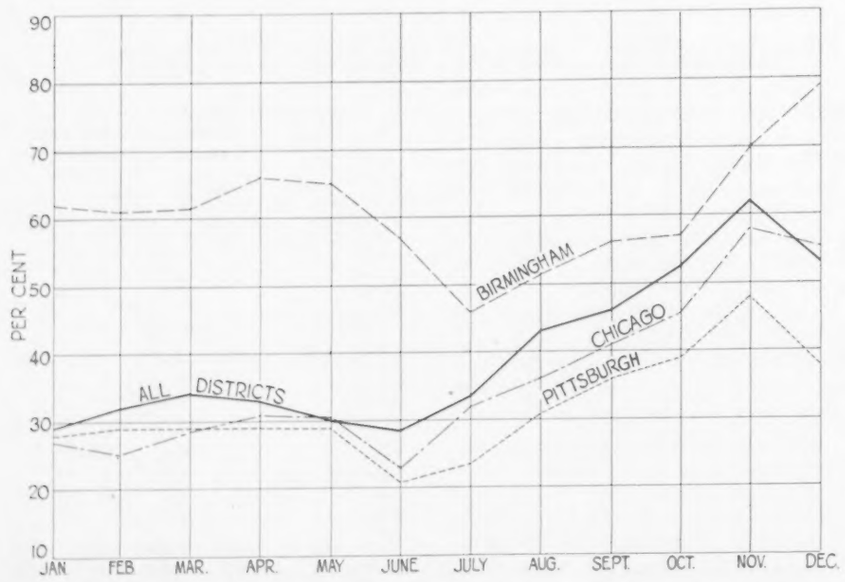
Birmingham, on the other hand, enjoyed relatively high operations throughout the year, being consistently ahead of not only Pittsburgh and Chicago, but also higher than the national average. Seemingly, the basing point changes were without effect on southern steelmaking, however, because operations the second six months of 1938 averaged slightly below the first-half rate.

Comparative figures for ingot production in per cent of capacity last year follow:

	First Half	Second Half
Pittsburgh	27	36
Chicago	27.5	45
Birmingham	62	60
Industry	31	48

There is little basis for assuming that Chicago's operating gains last year were made at the expense of Pittsburgh and were the result of the new basing point schedule. A comparison of steel production in the two districts in recent years indicates that Chicago experiences heavier output than Pittsburgh when business generally is slow, and that operations in the two areas tend to reach a parity as industrial activity improves. In other words, Chicago does relatively better than Pittsburgh in poor years, and *vice versa*.

For instance, average operations for the industry in 1934 were 37 per cent and the rate at Chicago was 48 per cent higher than at Pittsburgh. In 1935, with the industry averaging 49 per cent, Chicago's advantage was cut to 37.5 per cent. The next year, total output was 68 per cent of capacity and Chicago



■ **Pittsburgh and Chicago districts lagged behind the industry in steelmaking recovery the past six months. Birmingham showed the most stable operations throughout 1938**

had a 12 per cent margin over Pittsburgh. In 1937, with near-boom conditions prevailing and the national average 72 per cent, Chicago operations fell nearly 7 per cent behind the Pittsburgh rate.

Last year the industry again experienced depression and Chicago resumed its old position ahead of Pittsburgh.

Average operations for the two districts and for the entire industry in per cent of capacity the past five years follow:

	Pittsburgh	Chicago	Industry
1938	31.5	36	40
1937	73.5	68.5	72
1936	61	68.5	68
1935	38.5	53	49
1934	27	40	37

Explanation for the different reactions of these two leading steelmaking districts to variations in total demand probably lies in Pittsburgh's larger capacity for producing heavy rolled products. Depression generally finds lighter commodities more active than the heavy items, thereby permitting Chicago to engage a larger percentage of its facilities than Pittsburgh. As business broadens, activity in heavy products quickens. This exerts a more stimulating influence on steelmaking at Pittsburgh than at Chicago because of the former's greater capacity in such products.

Regardless of what advantage has accrued to southern mills by virtue of the basing point changes, Birmingham producers previously had displayed considerable resistance against the effects of depressed business. This was evidenced the first half of 1938 when the district's average steelmaking rate was double that of the industry as a whole. The fact that it already was at such a high rate prevented it from sharing to the same extent as other sections in the second-half revival.

Nevertheless, for all of 1938, Birmingham operations showed the largest increase of any district compared with the national average, as indicated in the following table.

Rank	District	Rate	*Change
1	Birmingham	60.85	+52.8
2	Detroit	48.56	+22.0
3	Wheeling	47.40	+19.1
4	Cincinnati	45.50	+14.3
5	New England	41.25	+ 3.7
6	Cleveland	39.93	+ 0.4
7	Youngstown	38.10	— 4.2
8	St. Louis	37.19	— 6.5
9	Chicago	36.31	— 8.7
10	Buffalo	34.92	—12.2
11	Pittsburgh	31.59	—21.1
12	Erie, Pa.	30.22	—24.1

Average, All Districts, 39.79

*Percentage change from average for all districts.

In 1937, Birmingham ranked third among all districts from the standpoint of capacity engagement.

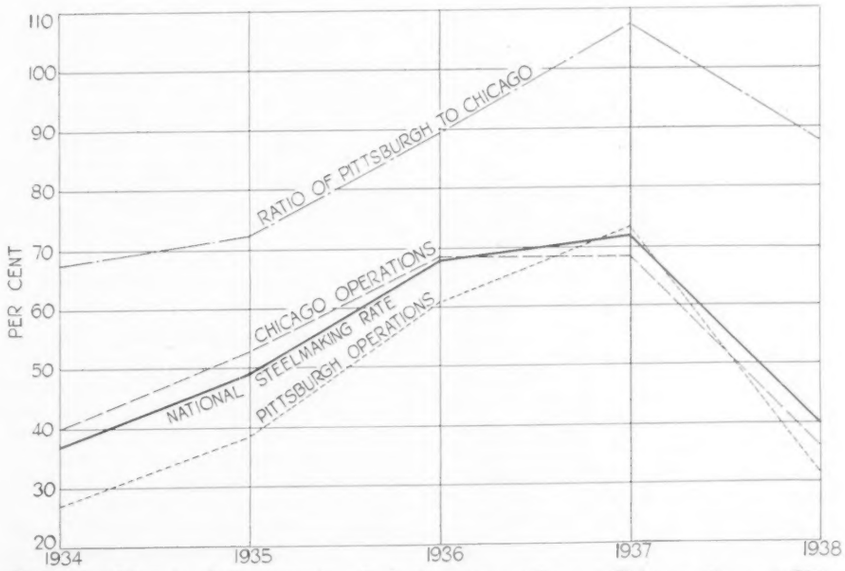
For years, steelmaking at Detroit has run well ahead of the national average. Its operations last year were 22 per cent higher than the average for all districts, and in 1937 the margin was 24 per cent.

Steel production at Detroit naturally is affected by sharp variations in automobile output. However, its geographical advantage in soliciting motor car tonnage prevents it from reaching an extremely low rate except in periods when automobile building is unusually depressed. For example, in 1934, a year worse than average in auto production, steelmaking at Detroit was at capacity for about eight weeks and never below 40 per cent. Average for all districts that year was only 37 per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Jan. 21	Change	Same week 1938	Same week 1937
Pittsburgh ..	42	— 2	26	81.5
Chicago	48	— 1	27.5	77
Eastern Pa...	34	None	31	53
Youngstown..	52	— 3	28	79
Wheeling	64	None	51	93.5
Cleveland ...	59	+ 2.5	26	78
Buffalo	44	None	23	84
Birmingham..	77	None	60	76.5
New England.	70	— 5	20	88
Cincinnati ...	55	—10	32	68
St. Louis.....	40	None	21	76
Detroit	88	+ 1	52	95
Average....	51.5	— 0.5	30.5	80



■ **Steelmaking in dull years is relatively more active at Chicago than at Pittsburgh, but the margin is closed as the industry approaches capacity operations**

PRODUCTION

■ STEELWORKS operations last week rose in two districts, declined in five and remained stationary in five. The national rate is estimated at 51.5 per cent. This compares with 63 per cent, the high point in the third week of November, 1938.

Youngstown, O. — With five open hearths withdrawn the rate last week lost 3 points to 52 per cent. Three bessemers and 43 open hearths were in production. Schedules for this week indicate a rate of about 49 per cent.

Pittsburgh — Receded 2 points to 42 per cent on lower schedule by larger interests. The same rate is indicated for this week.

Wheeling — Unchanged at 64 per cent, with principal producer close to capacity.

Cincinnati — Down 10 points to 55 per cent. One interest is to resume this week with four open hearths after a three-day suspension.

Chicago — Off 1 point to 48 per cent. One open hearth was added by each of two independent mills.

St. Louis — Steady at 40 per cent with the same rate scheduled for this week.

Detroit—Up 1 point to 88 per cent, from added production at Ford plant. Of 25 open hearths 23 are melting.

Cleveland — Increased 2.5 points to 59 per cent as result of addition of an open hearth by Republic Steel Corp.

Birmingham, Ala. — Held at 77 per cent for fourth consecutive week, with 17 open hearths in production.

Buffalo — Continued at 44 per cent, for the third week.

New England — Drop of 5 points made the rate 70 per cent last week.

Central eastern seaboard — Held at 34 per cent for the third week.

Revere Rounds Out Improvement Program with $3,250,000 Mill

■ REVERE COPPER & BRASS INC. last week announced completion of a $3,250,000 brass and copper mill at Rome, N. Y.

"This is the culmination of a plant improvement program started several years ago," said C. Donald Dallas, president. "In the past five years, several million dollars in addition to this has been expended in Revere plants at Rome, Chicago, Detroit, Baltimore and New Bedford, Mass."

He pointed out that much of the program was carried out during a period of depressed business. "Heavy industry cannot modernize during a period of great activity," he stated.

"The idea that heavy industry must stop capital outlay and accept plant depreciation and equipment obsolescence in dull times is all wrong. When factories are running double and triple shifts schedules cannot be disrupted by dismantling old machines and installing new ones. It is when business falls off that technical progress should advance more rapidly.

"More attention has been given recently to accurate control of physical properties along with development of alloys for specialized applications. A large part of Revere's expenditures have been for rolling mills equipped with antifriction bearings, conveyors, automatic pickling, cleaning and annealing equipment.

Rolling Accuracy Improved

"As a result, sheets and strip are rolled more accurately to gage, and surface finishes have been so improved that manufacturing plants have been able to eliminate some fabricating operations and turn out better products."

The new mill at Rome incorporates latest innovations in straightline production. It has monthly capacity of 2,000,000 pounds of brass strip up to 20 inches wide; this capacity is contained within a floor area of 72,000 square feet, believed by the company to be the lowest ratio in the industry.

Innovations include a new escalator conveyor system which automatically feeds and refeeds brass slabs into the breakdown mill, each sequence controlled by electric eyes. Continuous conveying system carries slabs through an annealing furnace and back to the rolling mill or to the scalping machine, thus eliminating the usual method of loading and unloading pans.

The scalping machine eliminates surface imperfections in one operation, replacing former methods. First rundown after scalping is on new 4-high and 2-high mills in tandem. An 80-foot straightline pickling machine patented by Revere uncoils, pickles, scrubs, washes, dries and recoils the brass continuously.

Annealing furnaces of new recirculating and recuperative types, give the metal predetermined physical characteristics through automatic controls. Operation of every machine in the entire mill is automatically recorded by remote-type instruments in the superintendent's office.

The new mill is adjacent to Revere's copper rolling mill, built in 1929, and having monthly capacity of 10,000,000 pounds of sheets and strip up to 48 inches wide.

Design Own Draw-Bench

Other new equipment at Rome includes automatic bright annealing furnaces, a new horizontal tube extrusion press, tube reducers, and a 120-foot high-speed draw-bench designed by Revere engineers for tubing.

Revere has installed a new fast 4-high continuous mill in its Dallas division plant, Chicago, which rolls up to 900 feet of thin-gage material per minute.

The Michigan division at Detroit has been completely revamped so that production is on a straightline basis.

A few months ago, Revere combined production facilities at Taunton, Mass., with those at New Bedford with the exception of equipment for rolling heavy plates. A new slab casting shop has been constructed at New Bedford equipped with electric furnaces.

An entirely new mill for drawing small-diameter tubing in long lengths has been installed at the Baltimore plant.

Views National Defense as Spur to Power Expansion

■ Impetus to public utility expansion will be given by the national defense program, according to Wylie Brown, president, Phelps Dodge Copper Products Corp., New York. Phelps Dodge has started operations in a new addition to its Yonkers plant, which was built "in anticipation of the wide utilities expansion currently under way and contemplated for the future."

Mr. Brown added: "Plans for construction of 1,000,000 kilowatts of generating capacity as a first step in the mobilization of power for national defense purposes put us on notice that we'll have to be prepared to help supply the materials going into this expansion."

WILL SPEND $33,000,000 FOR 1939 CONSTRUCTION

Commonwealth & Southern Corp. will spend approximately $33,000,000 for construction this year; $24,000,000 at its northern properties; $9,000,000 in the South, according to present plans. This figure may be increased substantially if the Supreme Court clarifies the Tennessee Valley authority situation sufficiently to assure private utilities against the inroads of federal competition.

Zinc Output Reduced; Tariff Affects Price

■ Production of zinc in the United States in 1938 was 456,470 tons, 22.5 per cent less than 589,619 tons in 1937, according to the American Zinc institute, New York.

Shipments totaled 395,199 tons in contrast with 569,241 tons in 1937, a decline of 30.5 per cent. Shipments usually are considered by the institute to represent consumption, but due to abnormal imports late in 1937, causing heavy year-end stocks, actual consumption in 1938 probably was substantially above shipments.

Prime western was quoted at 5.00c at the beginning of 1938, dropped to 4.00c April 8; rose to the year's high, 5.05c, Oct. 13. A 20 per cent cut in import duties, with signing of the Canadian trade agreement, effective Jan. 1, 1939, was a disturbing factor. On news of the tariff the price receded to 4.75c, and then to 4.50c on Nov. 29, which is the current market level.

SWOC May Ask Dues Collection In Mills

■ Dues collections by union stewards in steel plants may be proposed by the Steel Workers Organizing committee to companies with which it has contracts. SWOC officials last week were reported favoring this plan to bolster union revenue and to stimulate lagging interest in SWOC activities.

Sporadic dust-collecting raids at steel plants, especially in the Pittsburgh area, by SWOC pickets have brought warnings against further contract violations. While these raids resulted in some increase in collections, they did not solve the union's financial problems. Subsequently the "agent-in-the-mill" plan was formulated, and is reported to have been suggested to at least one producer.

Iron Ore Output In U.S. Off 61%

■ IRON ore production in the United States in 1938 amounted to 28,286,000 gross tons, 61 per cent less than in 1937, according to the bureau of mines' preliminary figures. Shipments from mines totaled 26,271,000 tons, valued at $73,196,000, a decrease of 64 per cent in quantity and 65 per cent in value.

Average value of ore at mines in 1938 is estimated at $2.79 per ton; in 1937 it was $2.87. Stocks at mines at the end of 1938, mainly in Michigan and Minnesota, were 7,552,000 tons, 37 per cent larger than in 1937.

Lake Superior ore, usually about 85 per cent of total shipments, contributed only 73 per cent in 1938. Production was 21,294,000 tons and shipments 19,224,000 tons, decreases of 65 and 69 per cent, respectively. Average value of lake ore at the mine was $3.07 in 1938, and $3.02 in 1937.

Southeastern states, including the Birmingham district, produced 4,211,000 tons 34 per cent less than in 1937. Shipments in this area totaled 4,196,000 tons valued at $7,238,000, 34 and 22 per cent, respectively, under 1937.

Northeastern states mined 2,288,000 tons, 27 per cent less than in 1937, shipping 2,359,000 tons valued at $5,948,000, 24 and 28 per cent, respectively, below 1937. Western states mined 493,000 tons and shipped 492,000 tons in 1938.

Imports for 11 months ended Nov. 30, 1938, were 1,935,311 tons valued at $4,867,630, compared with 2,443,069 tons valued at $5,841,637 for the full year 1937. Exports for 11 months, 1938, were 582,762 tons valued at $1,936,016, compared with 1,264,102 tons valued at $4,039,248 in all 1937. Practically all exports went to Canada. Chile supplied about 75 per cent of imports.

FINANCIAL

REPORTS NET PROFIT IN DECEMBER QUARTER

■ KEYSTONE Steel & Wire Co., Peoria, Ill., reports a net profit of $115,728, equivalent to 15 cents a share on 757,632 shares of capital stock, for the three months ended Dec. 31, the second quarter of the company's fiscal year. This compares with net of $32,226 in the same period last year, equivalent to 4 cents a share on capital stock.

In the six months ended Dec. 31, net profit amounted to $198,952, equivalent to 26 cents a share, against $235,919 or 31 cents a share for the period in 1937. Indications are that January earnings will be sufficient to put net profit for the first seven months of the fiscal year ahead of the total for the corresponding months last year.

RUSTLESS REPORTS PROFIT

Rustless Iron & Steel Corp., Baltimore, reports a net profit of $158,463 in the fourth quarter, compared with a net profit of $18,983 in the September quarter and a net of $82,212 in the fourth quarter of 1937. The company had a net profit of $81,110 for the 12 months ended Dec. 31, 1938, equal to $2.22 a share on common stock, against a net profit of $713,138, or 77 cents a share, during 1937. Directors recently declared the regular quarterly dividend of 62½ cents a share on the preferred stock, payable March 1 to record Feb. 15.

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American Radiator & Standard Sanitary Corp., New York, declared the regular quarterly dividend of $1.75 a share on preferred stock, payable March 1 to stockholders of record Feb. 17.

Steel Container Firm and Inland Propose Merger

■ Officers of Inland Steel Co. and Wilson & Bennett Mfg. Co., Chicago, announce that subject to ratification of their respective stockholders they have agreed upon terms of a merger of the two companies. Wilson & Bennett is one of the largest manufacturers of steel containers.

Heads Steel Foundries

■ Thomas Drever, vice president and treasurer, American Steel Foundries, Chicago, has been elected president, to succeed the late George E. Scott. Mr. Drever joined the company in 1910, remaining until 1924 when he became president, Wahl Co. On March 7, 1929, he returned to American Steel Foundries as secretary, treasurer and a director.

Aluminum Group Elects

■ Charles B. Bohn, president, Bohn Aluminum & Brass Co., Detroit, was elected president, Aluminum association, at its annual meeting in New York, Jan. 18. Other officers elected include: Chairman of the board, Arthur V. Davis, chairman, Aluminum Co. of America, Pittsburgh; eastern vice president, William Golden, Reynolds Metal Co., New York; western vice president, H. B. Harvey, president, Harvey Metal Corp., Chicago; southwestern vice president, J. J. Geraghty, Johnson Tin Foil Co., St. Louis.

Armco Reorganizes Sheet, Strip Sales Division

F. A. Tobitt — J. A. Ingwersen — G. W. Breiel

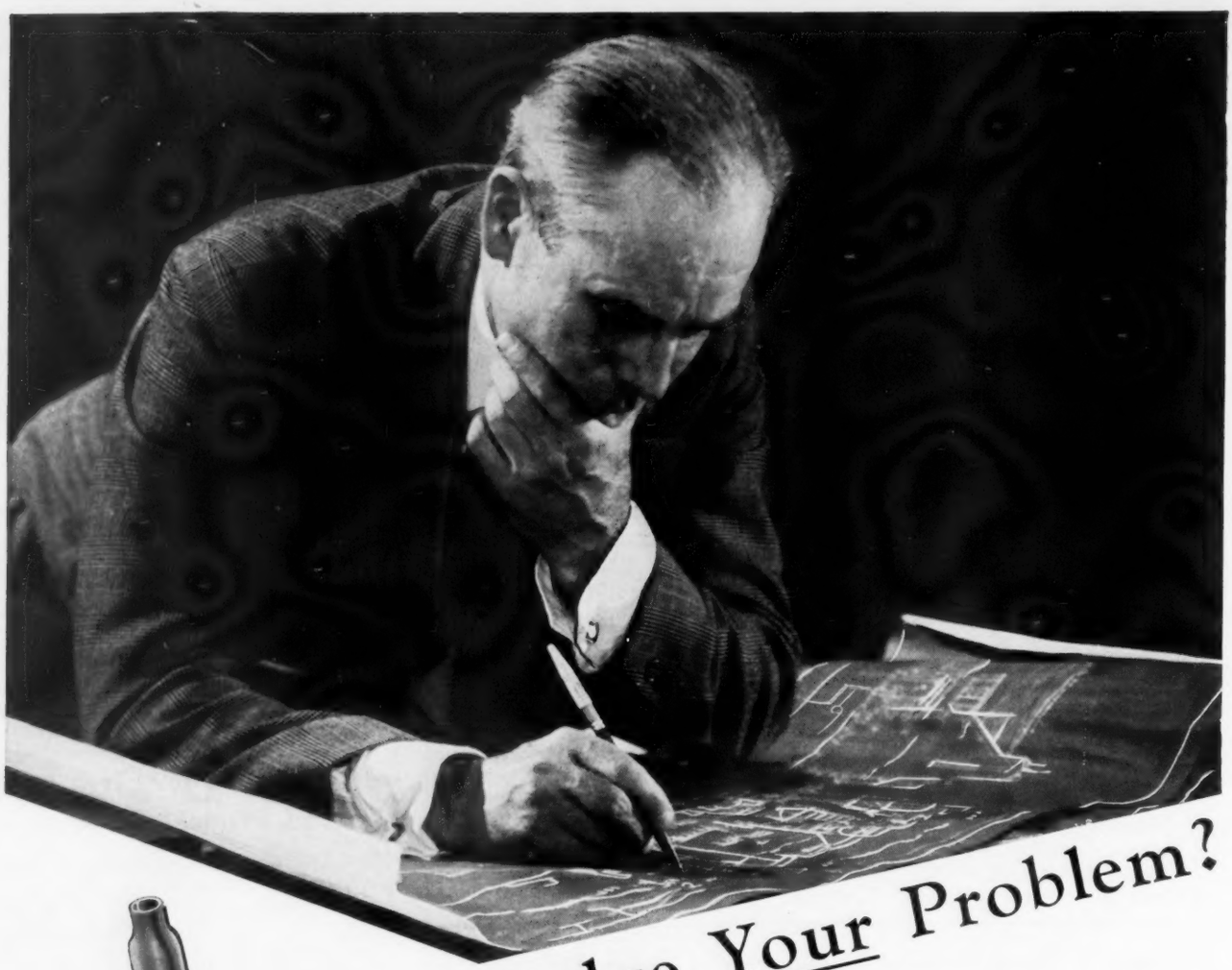
■ A home-office reorganization of the sheet and strip sales division is announced by W. W. Sebald, vice president, American Rolling Mill Co., Middletown, O.

F. A. Tobitt has been appointed manager of eastern sales; J. A. Ingwersen, manager of midwestern sales; and G. W. Breiel, manager of southern-western sales.

Mr. Tobitt joined the company in 1912 and has held various executive sales positions. For the past six years he has been manager of the company's enameling sheet sales.

Mr. Ingwersen has been identified with the company 15 years, first in employment service and later in sales work. He became manager of hot and cold rolled sales in 1932.

Mr. Breiel joined the sales organization in 1927, and was made manager of galvanized and long terne sales in 1932.



Can Tubing Solve Your Problem?

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THERE IS NOTHING EQUAL TO SEAMLESS

Windows of WASHINGTON

BY L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ BIGNESS in business was one of the topics of discussion at the annual meeting of the American Engineering council here last week. This body functions as the "engineers' embassy" in Washington, voicing the opinions of the engineering profession in national affairs.

In accordance with usual practice, the question was first discussed by Dr. Willard L. Thorp, director of research, Dun and Bradstreet, after which the meeting was thrown open to general discussion.

Dr. Thorp first presented, by means of charts based upon tax and social security returns, a picture of the relative part that large corporations now play in the American economy. He then discussed the growth of large enterprises, most of which took place during the "trust" period around the turn of the century and again during the "merger" period of the twenties. Finally, he pointed out that determination of the optimum size of corporations is no simple matter, because of the number of factors to be taken into consideration.

Size vs. Demand

It might be possible, for example, to calculate with some degree of accuracy the size of plant that would yield the lowest price per unit through the economies of large-scale production, but would this size fit in with marketing requirements? It is conceivable, for example, that the best size from a production standpoint would turn out too large an output to be marketed, or too small to justify the necessary sales expense.

Another factor entering into the problem is the public conception of bigness as slightly reprehensible, if no worse. This is an intangible factor that cannot be accurately measured but must nevertheless be considered.

Opening general discussion, Ralph E. Flanders, president, Jones-Lamson Machine Co., who presided, pointed out that any business has relationships with its stockholders, its employes, its customers, its competitors, with the government, and with the economic system as a whole. In none of these, he declared, does the matter of size exercise as much influence as do many other factors.

Varying Results of Competition

Dr. Harvey N. Davis, president of Stevens Institute of Technology, asked if the shift in emphasis that took place in recent years from the problems of production to those of sales did not have the effect of speeding up consolidations. Dr. Thorp agreed that it did, and went on to suggest a corollary thought: That while competitive effort in production usually results in manufacturing economies, lower prices, and thus in benefits to the general public, the same is not true of competition in selling. Here it is quite possible that competitive efforts may result in higher, rather than lower, prices to consumers.

William L. Batt, president of SKF Industries Inc., accounted for present agitation against business, and particularly big business, by the desire of the public to find a goat to blame for the fact that the 1930's are the first decade in United States history that has not witnessed a new high in productive activity. Business must fight this tendency, he stated, by telling the public what it has done in the way of providing better goods, prices and working conditions.

DR. THORP "NO. 1 MAN" WITH SECRETARY HOPKINS?

Dr. Willard L. Thorp of Dun and Bradstreet, who is heading up the monopoly work for the department of commerce, has been loaned to Secretary of Commerce Hopkins for six months as a consultant.

Dr. Thorp, who at one time was nominated as director of the bureau of foreign and domestic commerce but whose nomination had to be withdrawn by the President for political reasons, is well thought of in Washington, and is said to have good contact with industry. This is much needed by Secretary Hopkins. Just what he will do at the department has not yet been outlined but he will advise with the secretary on business and industrial matters.

There is a well authenticated story that Dr. Thorp stands No. 1 with the secretary, even ahead of the assistant secretaries of the department, and that he has the last "say" on letters and orders being signed by the new secretary.

SECOND QUESTIONNAIRE SENT; THIRD LATER

The second questionnaire to the steel industry is being sent out by the department of justice. When the information has been tabulated it will be turned over to the national economic committee.

This asks for information on distribution, and is for the years 1936, 1937 and 1938. The first questionnaire asked for information on ten steel products for the month of February this year and the second one calls for information on the same products. A third questionnaire will be sent out, but probably not until after the first two have been tabulated, which doubtless will take some months.

WOULD RESTRICT EXPORT OF STEEL PLATE SCRAP

Senator Schwellenbach, Washington, has introduced a bill in the senate (S. 651) to provide for "protection and preservation of domestic sources of scrap steel."

The bill, referred to the committee on military affairs, provides that after the expiration of 60 days from its enactment, no steel plate scrap shall be exported from the United States, except under license issued by the President.

Representative Faddis, Pennsylvania, has introduced a bill (H. R.

2644) amending the act for the protection of domestic sources of tin by inserting in section 2 of the present act a provision "for other scrap, drosses, or residues, the tin content of which is in excess of 1 per centum and in which copper content does not exceed the tin content."

Mr. Faddis also has introduced a bill (H. R. 2643) providing for the acquisition of stocks of strategic and critical raw materials, concentrates and alloys essential to the needs of industry in time of emergency. This bill is identical with one already introduced in the senate.

A bill (H. R. 2556) was introduced by Representative Scrugham, Nevada, which provided for the acquisition of stocks of strategic materials, etc., which is practically identical with the Faddis bill.

THIRD CONFERENCE ON TRANSPORTATION PROBLEM

The third meeting of the national transportation conference, set up last September by the Chamber of Commerce of the United States to develop a business man's program to improve the railroad situation will convene here Jan. 23-24.

Rounding out its earlier recommendations, the conference will seek to reach conclusions on railroad rates, federal financial aid and a number of other major problems listed in the agenda made public today.

Among other questions, the conference will pass judgment upon the desirability of creating a new transportation authority and will decide whether it desires to take a position on any proposal to "postalize" railroad rates.

Findings of the conference will be submitted to congress for consideration in connection with pending railroad legislation.

COMMISSIONER WOULD MAKE PATENT'S LIFE 20 YEARS

The temporary national economic committee reopened its monopoly hearings last week, when patent matters were discussed.

Conway P. Coe, commissioner of patents, submitted a program for correcting abuses in the patent system. He suggested the creation of a single court of patent appeals, a 20-year patent period, and the abolition of renewal applications.

He told the committee that patent renewal applications should be abolished. "Under the present practice," he said, "an applicant may prosecute his application to the point of allowance, fail to pay the final fee required by law, and thereafter renew the application and resume prosecution. This procedure seems to be wholly unnecessary."

Under the present law the witness said, an inventor may make public use of his invention for two years before filing his application.

"As a further step in accomplishing an earlier filing of the application looking to earlier issue of the patent, I propose that this public use be reduced from two years to one," said Mr. Coe.

ESTABLISHES BUREAU TO STUDY SECONDARY METALS

Dr. John W. Finch, director of the bureau of mines, has announced the establishment in his bureau of a secondary metals section to be located in Pittsburgh, in charge of James S. Earle, of Plainfield, N. J., as supervising engineer.

Its creation, he said, was necessitated by the constantly increasing importance of scrap as a factor in metal supply and by the growing demand upon the bureau for authoritative information.

Bureau officials have long recognized that the stock of metals in use and the scrap returning to industry constitute a great national resource, and the formulation of a sound public policy with respect to raw material supply is dependent upon a thorough understanding of the secondary metal problem.

The rapid growth of secondary metal production is exercising a profound influence on mining, which is said to be too little understood, by reason of insufficient data.

The various fact-finding activities of the bureau in regard to scrap will be consolidated in the new section, and expanded as need and opportunity arise.

WALSH-HEALEY IRON, STEEL ORDERS $1,817,744 IN WEEK

In the week ending Jan. 14, the government purchased $1,817,744 worth of iron, steel and their products, under the Walsh-Healey act, as follows: The Midvale Co., Washington, $486,500; Bethlehem Steel Co., Bethlehem, Pa., $21,600; St. Louis Steel Casting Co., St. Louis, $16,192; William Scrimgeour, Washington, $35,910.80; Wheeling Corrugating Co., Wheeling, W. Va., $13,460; Ohio Seamless Tube Co., Shelby, O., $53,084.29; Steel & Tubes Inc., Cleveland, $112,174.36; Bethlehem Steel Export Corp., New York, $35,562.50; Carnegie-Illinois Steel Co., Washington, two orders, price indefinite; Worth Steel Co., Claymont, Del., $223,000; Thomas Gregory Galvanizing Co., Philadelphia, $82,000; Enterprise Galvanizing Co., Philadelphia, $11,625; Alan Wood Steel Co., Conshohocken, Pa., $85,000; Worth Steel Co., Claymont, Del.; $71,000; Bethlehem Steel Co., Bethlehem, Pa., $22,000; Enterprise Galvanizing Co., Philadelphia, $10,000; Allegheny Ludlum Steel Corp., Brackenridge, Pa., $20,933.50; Taft Peirce Mfg. Co., Woonsocket, R. I., $15,550; Sheffield Steel Corp., Kansas City, Mo., $29,329.24; American Chain & Cable Co. Inc., Wilkes-Barre, Pa., $12,103; Rochester Ropes Inc., Jamaica, N. Y., $10,476.75; American Chain & Cable Co. Inc., Hazard Wire Rope division, Wilkes-Barre, Pa., $33,144.40; Wire Rope Corp. of America Inc., New Haven, Conn., $23,778.60; E. H. Edwards Co., San Francisco, $27,180.28; Gary Steel Products Corp., Norfolk, Va., $19,188; Carnegie-Illinois Steel Corp., Chicago, $33,837.87; John Wood Mfg. Co. Inc., Conshohocken, Pa., $285,310; and Pressed Steel Tank Co., West Allis, Wis., $27,803.60.

MACHINE-MATERIAL CONTROL QUESTION IN TEST CASE

If a manufacturer builds a machine and also makes the material to be used in the machine, may he legally insist that the person to whom he leases the machine also buy from him the material, to the exclusion of similar material offered by his competitors?

A complaint involving this question, and which is considered in the nature of a test case, was filed last week by the federal trade commission against Signode Steel Strapping Co., Chicago.

The complaint charges that the respondent leases and licenses the use of its steel strapping tools and machines, on condition the lessee or licensee will use only the flat steel strapping and steel tying wire which it processes and distributes. Failing to do this, it is said, the user loses his right to possession of the tools and machines.

"Except for this restrictive condition . . . the company would now be in active competition in the sale of steel strapping and tying wire," the complaint alleges.

DEMOCRAT PROPOSES TO REPEAL WAGNER ACT

A bill proposing repeal of the Wagner labor relations act and substitution of a labor relations law was introduced in the house last week by Representative C. Arthur Anderson, Democrat, Missouri.

A call to all workers throughout the nation to rally in defense of the Wagner act was sounded in a booklet issued by the so-called Labor's Non-Partisan league.

An effort was made to show why "every important amendment would weaken some part of the act," and how, taken together, according to the league, they would transform the act from a law promoting labor organization and industrial peace, into a measure which would increase industrial strife, obstruct union activities, and create greater obstacles to peaceful collective bargaining than existed before the Norris anti-injunction act was passed.

MEETINGS

GIRDLER TOASTMASTER FOR TRAFFIC CLUB DINNER

■ ABOUT 2000 industrial leaders and transportation executives are expected to attend the thirty-eighth annual dinner of the Traffic Club of Pittsburgh, in Pittsburgh, Jan. 27. Principal speaker will be C. Wayland Brooks, Chicago attorney and former Cook county state's attorney in which capacity he won distinction in fighting rackets and crime. Tom M. Girdler, chairman of board, Republic Steel Corp., Cleveland, will be toastmaster.

The Pittsburgh club holds a unique position among traffic organizations because it was the first such club organized and its annual dinners attract large numbers of prominent people. Clifton C. Gray, general freight agent, Western Maryland railway, is president.

LABOR SITUATION TO BE CLEVELAND MEETING TOPIC

Associated Industries of Cleveland will hold its nineteenth annual meeting at a luncheon at Hotel Statler, Cleveland, Jan. 25. William Frew Long, general manager of the organization, will speak on "The Realities of the Labor Situation." Following the address, new governors will be elected.

HIGHWAY OFFICIALS WILL CONVENE IN NEW YORK

Association of Highway Officials of North Atlantic States will conduct its fifteenth annual convention at Hotel Pennsylvania, New York, Feb. 15-17. Among topics for sessions are: Safety, design and construction, and maintenance. A. Lee Grover, secretary, state highway department, Trenton, N. J., is secretary.

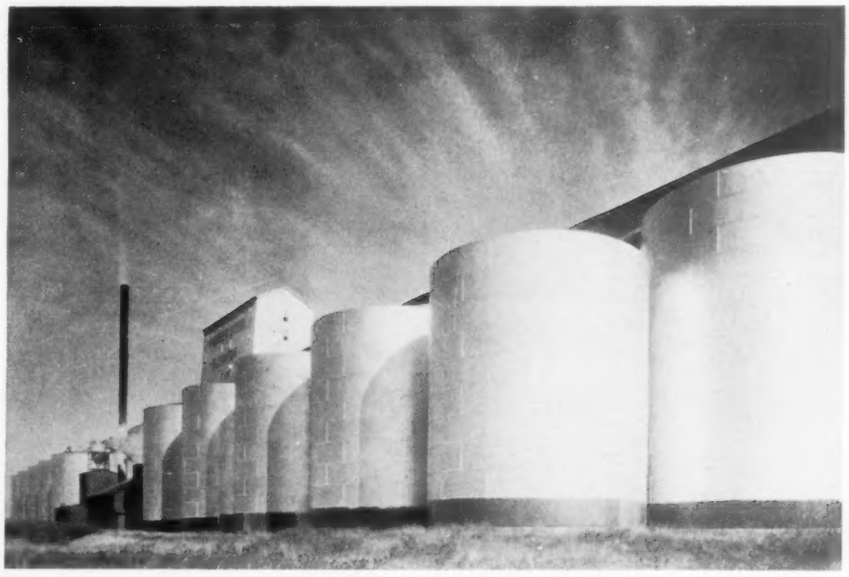
WISCONSIN FOUNDRYMEN TO HOLD SECOND CONFERENCE

Second annual foundry conference under sponsorship of the Wisconsin chapter of the American Foundrymen's association and the department of mining and metallurgy, University of Wisconsin, Madison, Wis., will be held at Hotel Schroeder, Milwaukee, Feb. 16-17. Technical sessions during the two days will be devoted to steel, gray iron, malleable and nonferrous castings and their manufacture. Charles I. Wesley, Wesley Steel Treating Co., Milwaukee, and Prof. E. R. Shorey, University of Wisconsin, are serving as co-chairmen of the conference.

STEEL Index Is Ready

The index to Volume 103, STEEL, *for the last six months of* 1938, *now is ready for distribution. Copies will be sent to all subscribers requesting them.*

Steel + Aluminum = Beautiful "Space Capsules"



■ **"Space Capsules" is the title given to this photographic study of a battery of aluminum-painted steel grain storage elevators in Minneapolis. The photograph by Carl W. Nestler was chosen to hang in the seventh annual salon of photography at the Minneapolis Institute of Arts. "As often demonstrated," remarked an observer, "steel structures may be made pleasing to the eye"**

Canadians Prepare for British Airplane Orders

■ Considerable expansion of Canada's aircraft industry is under way. Fleet Aircraft Ltd., Fort Erie, Ont., is building a $100,000 plant at Fort Erie. Boeing Aircraft of Canada Ltd., subsidiary of Boeing Airplane Co., Seattle, will take bids early this year on a factory to cost $300,000. Canadian Car & Foundry Co. Ltd., Montreal, has acquired the plant of Thomas Davidson Mfg. Ltd., and intends to remodel it for production of bombing plane parts.

Formation is expected in the near future of a committee to marshal Canadian industry in large-scale production of airplanes and other defense equipment for the British government. Military plane orders totaling more than $200,000,000 are contemplated in addition to those already awarded.

ORDERS FIVE NEW PLANES

American Airlines will spend $560,000 for five new DC-3 planes, ordered from Douglas Aircraft Co., Santa Monica, Calif. They will be delivered in May. In March the company will receive five Douglas planes ordered last October.

Sees Manufacturing Advantages in Britain

■ American manufacturers have an increasing opportunity to extend their operations successfully by establishing plants in Great Britain, Albert S. Low, vice president and chief engineer, The Austin Co., said on his return from London last week. Mr. Low established a permanent organization in London, Austin Engineers Builders Ltd.

Earnings records of American companies' manufacturing subsidiaries already located there proves the desire for our products and demonstrates the practicability of adapting our production methods to existing conditions, Mr. Low declared.

Brazil's First Modern Coal Washery from U. S.

■ McNally-Pittsburg Mfg. Corp., Pittsburg, Kans., has shipped to Porto Alegre, Brazil, a complete automatic coal tipple and washery. It represents about 600 tons of steel and machinery, requiring 15 freight cars for its transportation.

This will be the first modern coal washery in Brazil. Designed by the company's engineers and completely fabricated at the Pittsburg plant, it will be erected at the San Jeronymo mine of the Consorcio Administrador de Emprezas de Mineracao, near Porto Alegre.

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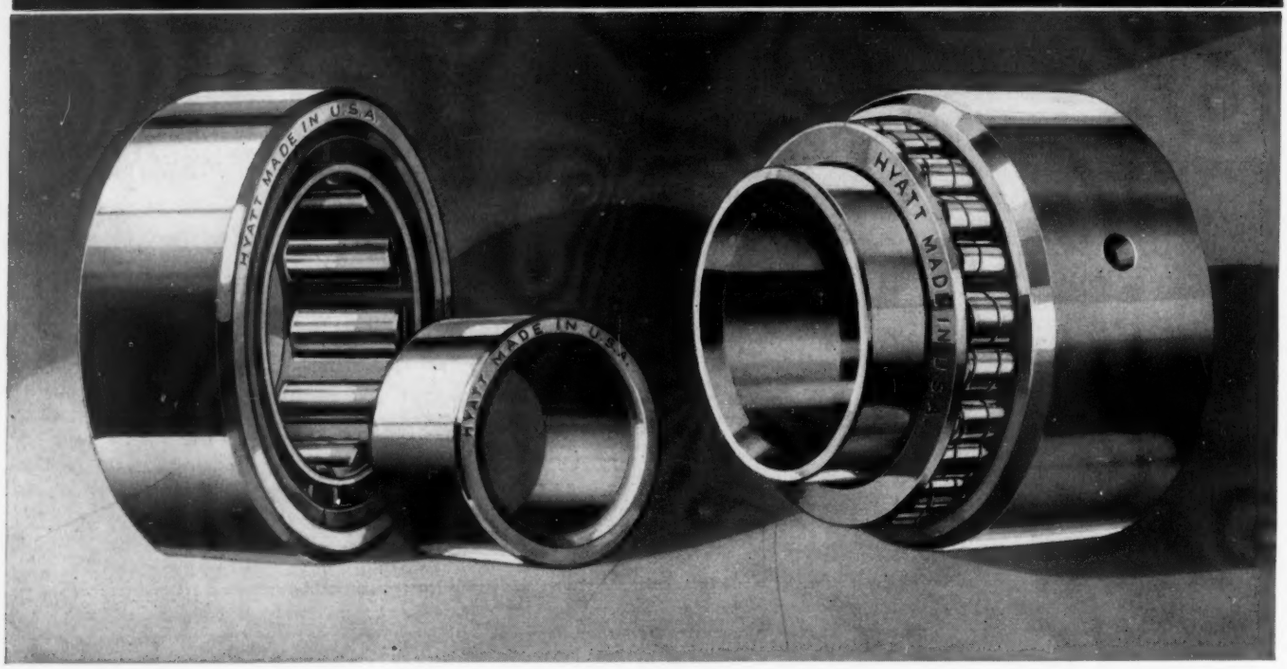

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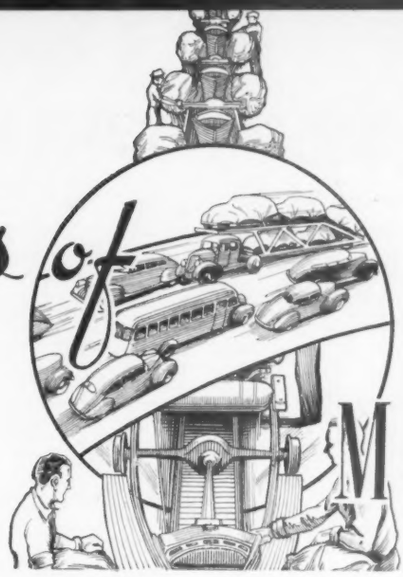

BY A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ NOTHING short of a Hollywood adjective mill could describe the size and impressiveness of Ford's mammoth new press plant, now operating at near capacity. Viewed from overhead walkways, four of which extend the length of the 1300-foot main bay, a sea of presses appears to fill the half-million square feet of floor space in this section, broken only by occasional patches where gangs of welders are at work on parts in process. The entire scene is rimmed and criss-crossed by overhead chain conveyors with their trains of stampings enroute to subassembly or the rail shipping dock.

Walkways, some 16 feet above the working floor, serve the dual purpose of keeping crowds of visitors in a safe position, out of the way of workmen, and of providing a better vantage point to inspect operations below.

Walks extend along both sides of the bay and directly through the two lines of columns supporting the monitor roof. The columns are diverted from the floor to a point about 8 feet over the walkway, where they join and continue upward as a single column. Below the walks a latticework ties them together. Thus the walkways can be made perfectly straight and can pass through the columns. Steel floor plate with a raised pattern is used on the walkways and they are flanked with an all-welded steel pipe handrail.

Walkways Extend 4900 Feet

Nearly a mile of these walkways has been installed—4900 feet to be exact—and when a visitor traverses their complete length he knows he has been for a walk.

Working floor in the main bay is at a level 17 feet off the ground, thus giving a total floor space in the new plant of 1,500,000 square feet, compared with an "under roof" floor space of 850,000 square feet. Foundations for the building are H-piling, driven to an average depth of 80 feet.

Location of the press plant is ideal with relation to the rest of the Rouge plant. L-shaped, the main bay extends northward across road 4, and the other leg spans road 4 and connects with the steel mill building and the cold-rolling mill. To the west are the former pressed steel building and the spring and upset building, now joined with the new structure as a single unit.

The roadway now passes under the new building, through a tunnel more than 100 feet wide. South of the roadway is another new section for storage of steel coils, preparatory to routing them northward through the various press lines. The main bay comprises three craneways about 100 feet in width and here the bulk of stamping operations is concentrated.

A quick summary of equipment in the press plant shows a total of 1600 presses, including 197 over 50 tons in weight and requiring sub-bases. Of the latter, the largest is a group of 300-ton triple-action presses for quarter-panel stampings, each carrying a 30-ton die and supported on a 90-ton sub-base. The crown or top unit alone on these presses weighs 110 tons. Other equipment included 500 spot and seam welders, 400 gun welding units, 200 miscellaneous rolling and shearing ma-

◆

Gages Visibility

■ **De Soto engineers conceived this "dummy driver" for use in determining visibility angle of windshields. Weights simulate the average driver's body, and electric bulbs at proper height and distance apart represent his eyes. Light from the "eyes" is thrown through the windshield and side windows, outlining them on a screen in front of car, and facilitating measurement of visibility**

chines, and 160 units in the plant's die room for tool and die maintenance.

About 25 separate overhead chain conveyor systems are operated. One interplant conveyor which transfers fenders from forming operations into the adjacent paint shop is 8000 feet in length. A side panel conveyor system is 3900 feet long; a roof and body parts conveyor also 3900 feet long; a hood and chassis parts conveyor 4200 feet long. All conveyors are protected by wire mesh guards at certain points where the falling of a piece might endanger workmen below. Automatic stops are installed on all inclines so that in the event a conveyor chain should break, slippage would be arrested instantly.

Typical of all Ford plants, the new building is spotless throughout. Floors are clean and free from oil. Of course, this might be expected in a new building, but it is safe to say that a year from today, conditions will be the same.

On the day this writer inspected the plant, a maintenance man was noticed busily digging small bits of steel from a woodblock floor. Anyone who has visited the average stamping plant knows wood floors usually become covered with small disks and cuttings of steel embedded in their surface. Not a one is allowed to remain in the Ford floor.

New Tool Shop Nears Completion

A second large unit of the Ford expansion is the tool and die shop which is now nearing its final stages, and a large force is already at work. Eventually it is planned to have a working force of some 2000 trained toolmakers per 8-hour shift. An experienced tool man here has expressed the opinion there are not 2000 trained toolmakers in the entire city, but Ford probably will develop such a force, even if they must be trained in Ford schools.

There are about 2100 machines installed in the new tool shop—some are still going in—of which it is reported 1600 have been transferred from other locations in the plant, 300 are reconditioned machines, 200 were purchased new.

Special attention has been paid to conveniences for workmen. Spacious rooms are provided for lunches. Tiled showerbaths are another novelty. Special landscaping effects will be placed around the outside of the buildings. In fact, the story is told of two executives from an eastern plant who, after inspecting the facilities, inquired of the superintendent as to whether it would be agreeable for them to move out of their hotel and into the tool and die shop for their stay in Detroit.

■ ACE which Homer Martin, UAW president, is holding up his sleeve in the current bickerings which are going on between the harried union official and his executive board is believed to be some sort of agreement with Ford involving recognition of a union by Ford officials. Some reports are heard to the effect a tie-up may be made between the UAW and the Liberty Legion, an organization originating within the ranks of Ford employes some months ago.

In any event, Martin in secret conferences with the board and with CIO officials, Philip Murray and Sidney Hillman, was able to achieve his goal of a national referendum on his policies. This will take place at a UAW convention in Cleveland, March 20. Location of the meeting away from Detroit was announced by the board as a means of forestalling the appearance of "Martin strong-arm squads" which have stormed several meetings of the executive board here in the Griswold building.

The question now: Will Ford at last recognize the UAW and the CIO as representatives of some employes? If he does, it will be on his own terms and because Mr. Ford himself has decided favorably. Considerable speculation is heard over what the possible effect such recognition might have on the power of Harry Bennett and his staff over the conduct of employes in Ford plants.

The all-seeing eyes and long arms of Mr. Bennett's forces are legendary, but it is true that he is a powerful, albeit quiet, figure in labor relations activities, and more than one harassed plant manager here has sought his advice when beset with labor difficulties. Whether recognition of the UAW would mean any shearing of power of the Ford service department is doubtful.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	227,130
Feb.	300,810	383,900	202,589
March	438,943	519,022	238,598
April	527,625	553,231	238,133
May	480,518	540,377	210,183
June	469,368	521,153	189,399
July	451,206	456,909	150,444
Aug.	275,934	405,072	96,936
Sept.	139,820	175,630	89,623
Oct.	230,049	337,979	215,296
Nov.	405,799	376,629	390,350
Dec.	518,958	347,349	*412,000
Year	4,616,274	5,016,437	*2,660,681

*Estimated.

Estimated by *Ward's Reports*

Week ended:	1938	1937†
Dec. 24	92,890	67,230
Dec. 31	75,215	49,550
Jan. 7	76,685	54 084
Jan. 14	86,925	65,735
Jan. 21	90,205	65,418

†Comparable week.

	Week Ended Jan. 21	Jan. 14
General Motors	35,440	35,540
Chrysler	23,310	20,860
Ford	21,750	21,750
All others	9,705	8,775

■ DOMESTIC retail deliveries of Buick cars during the first ten days of January totaled 3626 units, compared with 5988 in the corresponding period of December and with 2587 in the first ten days of January, 1938—an increase of 40 per cent over a year ago. Buick output currently is running at about 1200 cars daily, four days a week, with schedules calling for 20,000 units this month. Unfilled orders total about 7000. December sales of Pontiac reached 14,094, compared with 9454 in the same month of 1937. Used car sales by Pontiac dealers in December totaled 21,078.

■ CONVEYOR chains operating in high-temperature zones, such as in baking and enameling ovens, present a lubricating problem that has been troublesome. Recent tests show that a mixture of a finely colloidal graphite suspended in kerosene meets demands, the kerosene evaporating and leaving a thin deposit of fine graphite on the chains. . . . A Toledo, O., tool and die maker has invented a new type of cookie cutter which is said to eliminate waste and will form the basis of operations of a new company, the Bauroth Mfg. Co. . . . Buick again will sponsor broadcast of the Louis-Lewis fight in New York, Jan. 25, which it is hoped will last for more than two minutes and 19 seconds. . . . Plymouth has announced "economy" controls for 1939 models permitting fuel savings as high as 25 per cent; they include such items as special carburetor, special intake manifold, hardened steel throttle-stop, and manifold heat shields—recommended to fleet operators. . . . Pontiac pistons are all manufactured to a uniform weight which does not vary more than 1/16-ounce, even on oversize pistons. Chrome-nickel alloy iron pistons are cast with a balancing ring around the inside of the bottom edge which can be machined off.

■ Establishment of an industrial fellowship in the Mellon institute, Pittsburgh, by American Air Filter Co. Inc., Louisville, Ky., is announced by Dr. Edward R. Weidlein, institute director. The fellowship will investigate materials for air-conditioning filters.

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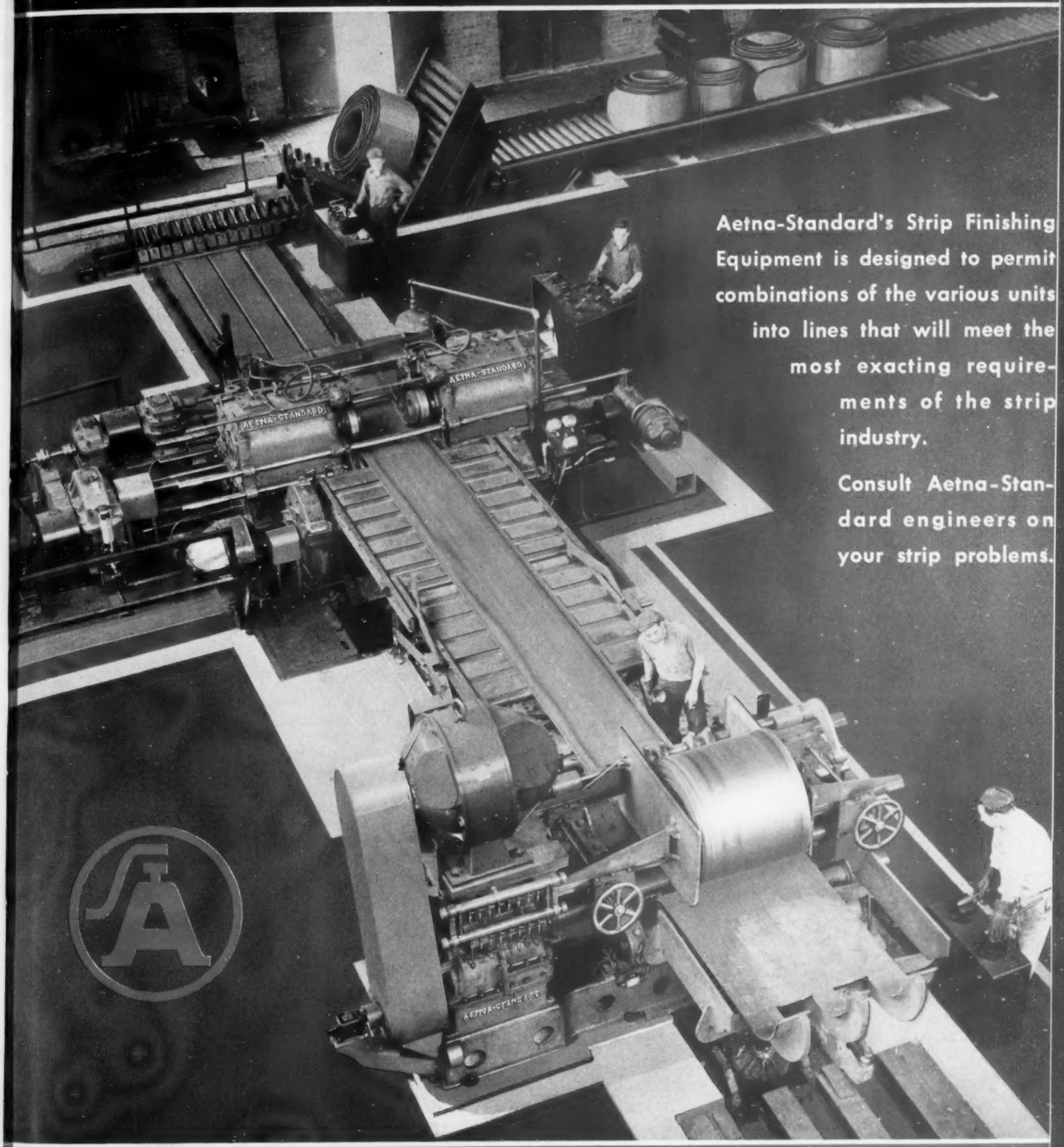

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MEN OF INDUSTRY

■ J. W. ROBINSON has been appointed assistant manager of sales, hot rolled products department, Jones & Laughlin Steel Corp., Pittsburgh. He formerly was associated with the corporation's Detroit sales office. A graduate of the University of Michigan, Mr. Robinson served in the United States army during the World war and was first employed in 1920 in the metallurgical department of Wills-St. Clair Co. Prior to joining Jones & Laughlin in 1934 he was with the Packard Motor Car Co. and Higgins Bothwell Co., Detroit.

♦

J. L. McClane has been named general manager, Seversky Aircraft Corp., Farmingdale, N. Y.

♦

D. Buttles has been named national sales manager, Cummins Engine Co., Columbus, Ind.

♦

Carl Hildebrand has been elected president, Sandvik Steel Inc., New York. He succeeds W. D. Thomas, resigned.

♦

Fred E. Bishop, of Pittsburgh, has been appointed general sales manager, Graham-Paige Motors Corp., Detroit.

♦

David R. Detwiler, vice president, Midland Wire Corp., Tiffin, O., has announced sale of his interests in the company and retirement.

♦

Murray W. Sales, president, Murray W. Sales & Co., Detroit, engineers' supply firm, has been elected a director, National Steel Corp., Pittsburgh.

♦

William R. France has been appointed district sales representative in Minnesota for Chicago Steel Service Co., Chicago, with offices in the Plymouth building, Minneapolis.

♦

R. D. Koenitzer has resigned as chief engineer, Perfex Corp., Milwaukee, to become sales engineer with Young Radiator Co., Racine, Wis.

♦

W. J. Davidson, general sales manager, diesel engineering division, General Motors Sales Corp., has been elected president, Society of Automotive Engineers.

♦

L. R. Boulware has resigned as vice president and general manager, Carrier Corp., Syracuse, N. Y., manufacturer of air conditioning equipment. He will continue as a director.

♦

Charles A. Boillod has been appointed sales manager, Pan American Airways, New York. The past six years he has been assistant to the general traffic manager.

♦

Dan S. Keenan has been named president, Carnegie Natural Gas Co. and Apollo Gas Co., Pittsburgh, United States Steel Corp. subsidiaries. He succeeds the late S. W. Meals.

♦

M. V. Dreyspool has been appointed general agent in the United States and Canada for Globe Wire Die Co., maker of carbide and diamond dies, with headquarters at 299 Madison avenue, New York.

J. W. Robinson

♦

S. E. Connair has been named plant engineer, Inland Mfg. division, General Motors Corp., Dayton, O. G. D. McLaughlin has been transferred to the Rahway, N. J., division of the company.

♦

Charles W. Pearson, vice president and sales manager, Buffalo Foundry & Machine Co., Buffalo, has been promoted to executive vice president and general manager. He is also a director.

♦

Harry Goldman, Riverside Scrap Iron & Metal Co., Detroit, has been elected president, Detroit chapter, Institute of Scrap Iron and Steel Inc. Other officers chosen are: Vice president, Milton Mahler, Morrow Steel Co.; secretary, G. D. Skinner, Luria Bros. & Co. Inc.; treasurer, H. W. Smith, Samuel G. Keywell Co. Inc.

Buffalo and St. Louis chapters have re-elected their officers.

♦

A. J. Manson, manager, transportation sales department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been elected a member of the board of directors, Electric Railway Equipment Securities Corp., New York.

♦

Bradford B. Smith has resigned as an economist with the New York stock exchange to become special statistical assistant to Enders M. Voorhees, chairman, finance committee, United States Steel Corp., New York.

♦

Louis W. Falk and W. P. Schmitter have been appointed executive engineer and chief engineer, respectively, Falk Corp., Milwaukee. Harold S. Falk, vice president, continues in his present capacity as director of engineering.

♦

E. E. LeVan has been elected vice president, Haynes Stellite Co., a unit of Union Carbide & Carbon Corp. Mr. LeVan has been general sales manager and is located at the company's general office and works at Kokomo, Ind.

♦

Armand T. Chandonnet has been named general manager and treasurer, Elmira Foundry Co., Elmira, N. Y., subsidiary of General Electric Co. He succeeds James D. McCann, retired. Mr. Chandonnet formerly was assistant manager.

♦

J. F. Chapple has been appointed assistant district sales manager at Houston, Tex., for Republic Steel Corp., Cleveland. Mr. Chapple started with Gulf States Steel Co. in 1918, serving as salesman in the Birmingham territory after its merger with Republic.

♦

W. D. Endres, divisional manager of the Billings & Spencer Co.'s Chicago branch office and warehouse, has been named sales manager in charge of the merchandise tool division, with headquarters in Hartford, Conn. He succeeds W. Roy Moore, resigned.

♦

James H. Critchett and Francis B. Morgan have been elected vice presidents, Electro Metallurgical Co., New York, a unit of Union Carbide and Carbon Corp. Mr. Critchett has been in charge of research work and Mr. Morgan, works manager.

♦

David E. Anderson, until recently chief engineer, Bohn Aluminum & Brass Corp., Detroit, and well known for his research work on

combustion engines and fuels, has joined the Holley Carburetor Co., Detroit, in the capacity of research engineer.

♦

Ralph A. Terrell has joined the sales organization of Tool Equipment Sales Co., Chicago. He formerly was associated with Boyar-Schultz Corp., Chicago; Ingersoll Steel & Disc Co., Chicago, and South Bend Tool & Die Co., South Bend, Ind.

♦

A. L. Spencer has been appointed sales representative in the Cleveland district for E. F. Houghton & Co., Philadelphia. Mr. Spencer, formerly in the Minneapolis territory, succeeds W. A. Fletcher, who has been transferred to similar duties in the Philadelphia area.

♦

E. W. Hinckley, for 20 years manager, Boston branch, Berry Bros., Detroit, has been appointed sales manager. C. E. Spooner has been named manager of industrial sales. J. D. Greene is now manager of advertising and sales promotion. Rushing Y. Cutler has been elected to the board.

♦

William P. Knecht, the past ten years manager of the Boston branch and warehouse of Crucible Steel Co. of America, New York, has been appointed manager of Crucible's British and Continental business, with headquarters at the company's London branch. He has been associated with the company since 1921.

♦

Albert R. Breen, 80 East Jackson boulevard, Chicago, has been appointed exclusive sales agent in the Middle West for the line of products of Fidelity Machine Co., Philadelphia, including ribbers, tubular knitting machines, cylinders and dials, knitting attachments, braiding, winding and spooling machines.

♦

Bayard W. Hunsicker, affiliated with the Treadwell Construction Co., Midland, Pa., since its founding, serving as purchasing agent, secretary and treasurer, and for the past ten years vice president and treasurer and a director, has become associated with American Paper Products Co., East Liverpool, O., as vice president and treasurer. He will retain his directorship in the Treadwell company.

♦

L. M. Kirk has been appointed superintendent of mold preparation in the open-hearth and central mills division of Gary Works, Carnegie-Illinois Steel Corp. Mr. Kirk's experience in the steel industry began in 1927 when he was employed as assistant master mechanic at the Johnstown, Pa., plant of Bethlehem Steel Co. In 1936 he joined Worth Steel

L. M. Kirk

Co. as assistant open-hearth superintendent and remained there until his present appointment.

♦

M. E. Cummings and G. D. Moomaw have been named manager and assistant manager, respectively, Syracuse district, Crucible Steel Co. of America, New York. Mr. Cummings has been in the employ of Crucible since 1923 and formerly was manager of its Sanderson works. Mr. Moomaw joined the company in 1927 and formerly was superintendent, Halcomb works.

♦

W. Neal Gallagher, Automatic Washer Co., Chicago, has been reelected president, American Washer & Ironer Manufacturers association for 1939. New officers include: First vice president, R. D. Hunt, Dexter Co.; second vice president, A. H. Labisky, Barton Corp.; third vice president, L. C. Upton, 1900 Corp.; executive secretary and treasurer, Joseph R. Bohnen.

DIED:

■ CHARLES MASON GRIFFITH, 70, retired vice president, Taylor-Wharton Iron & Steel Co., Wharton, N. J., in Easton, Pa., Jan. 11.

♦

N. Phillip Lord, 39, production manager, Spencer Turbine Co., Hartford, Conn., in that city, recently.

♦

E. J. Baur, 70, secretary-treasurer, Medart Co., St. Louis, in that city, Jan. 8. Mr. Baur had been associated with the company 20 years.

♦

Mrs. Charles M. Schwab, 79, wife of the chairman of the board of Bethlehem Steel Co., Bethlehem, Pa., Jan. 12.

♦

Peter J. Ward, 66, who retired Jan. 1 as manager of American Steel Foundries plant in East St. Louis, Ill., in that city, recently. He joined the company in 1902, and in 1904 was appointed works manager.

♦

Hugh A. Maloney, 63, former general superintendent of Pittsburgh Steel Co.'s Monessen, Pa., plant, Jan. 11. He retired six years ago.

♦

Otto H. L'Orange, 65, superintendent of the United States Vanadium Corp.'s plant at Columbiana, O., in that city, Jan. 3.

♦

Harold W. Anderson Sr., 59, at his home in Chicago, Jan. 11. He was vice president, Anderson Bros. Brass Foundry.

♦

William F. Chase, purchasing agent and office manager, Hartford Electric Steel Corp., Hartford, Conn., in that city, Jan. 4.

♦

Harry C. H. Walsh, 74, president and founder, Walsh Press & Die Co., Chicago, in that city, Jan. 15. He organized his company in 1927.

♦

Michael Riesner, consulting engineer, Worthington Pump & Machinery Corp., Harrison, N. J., and an authority in the field of air and gas compression, in Buffalo, Dec. 12.

♦

Edward F. Yarnelle, 88, retired chairman of the board, Mossman Yarnelle Co., Fort Wayne, Ind., in that city, recently. He was identified with steel warehousing since 1882 when he founded the company.

♦

A. E. Brown, 64, in Chicago, Jan. 4. Mr. Brown, whose home was in Youngstown, O., had been manager of railroad sales for Truscon Steel Co. for 20 years prior to his retirement last year.

♦

Paul H. Weaver, 51, the past eight years assistant manager, replacement spring division, Eaton Products Inc., Cleveland, in Shaker Heights, O., Jan. 14.

♦

Thomas Fitch Rowland Jr., 82, who retired ten years ago as president, Continental Iron Works, Brooklyn, N. Y., in that city, Jan. 12. He became affiliated with the Continental works, owned by his father, and upon the latter's death in 1907, took control of the business.

♦

Moritz Kahn, vice president, Albert Kahn Inc., Detroit, Jan. 16. A graduate of the University of Michigan as civil engineer, he became associated with American Bridge Co. in 1903, and a year later, with Trussed Concrete Steel Co. From 1906 to 1923 he served as managing director, Trussed Concrete Steel Co. of England. In October of the latter year he rejoined his brother, Albert, in Detroit. Trussed Concrete Steel Co., which they had organized, subsequently became Truscon Steel Co., now controlled by Republic Steel Corp.

Activities of Steel Users, Makers

■ RELIANCE Steel Corp., Cleveland, has purchased the Sheet Metal Mfg. Co., Youngstown, O., steel sheet wholesaling firm. The business will be continued by Reliance as the Sheet Manufacturing Youngstown division, and activities will be expanded to embrace galvanized sheets, roofing and siding. Thomas J. Fitzgerald, former vice president in charge of sales, Sheet Metal company, will continue as manager of the division.

♦

Flexrock Co., Philadelphia, is now located in its new plant at Twenty-third and Manning streets.

♦

Benn Supply Co., iron and steel distributor, Jersey City, N. J., has purchased the former property of the American Musical Wire Co.

♦

Edward Valve & Mfg. Co. Inc., East Chicago, Ind., has appointed the following representatives: W. E. Bowler, Witherspoon building, Philadelphia, to cover the Philadelphia and Wilmington, Del., districts; Frank W. Hoyt, Waverly, Pa., in the Scranton, Easton, Bethlehem, Reading, York and Harrisburg areas.

♦

Milcor Steel Co., Milwaukee, subsidiary of Inland Steel Co., Chicago, is establishing a new warehouse at Baltimore.

♦

Dow Chemical Co., has licensed Hills-McCanna Co., Chicago, to fabricate Dowmetal in the form of sand castings.

♦

Youngstown Sheet & Tube Co., Youngstown, O., has been licensed by Inland Steel Co., Chicago, to produce lead-bearing steel under the latter's patents.

♦

Fish Rotary Oven Co., Beloit, Wis., manufacturer of commercial bake ovens, is now under control of H. T. Scott, who has assumed active management.

♦

Robert M. Hadley Co., manufacturer of electrical transformers, has opened its new plant in Newark, Del. The original Hadley factory in Los Angeles will continue in operation.

♦

Arcos Corp., Philadelphia, maker of arc welding electrodes and electric welding machines, has appointed Ducommun Metals & Supply Co., Los Angeles and San Francisco, distributor on the West coast.

♦

Work has begun on Allegheny Ludlum Steel Corp.'s $100,000 warehouse in Chicago. The new building, 84 x 236 feet, fireproof construction, will be located at 4735 South Kedzie avenue, Kenwood industrial district, and will be finished April 1.

♦

Pittsburgh branch of Crucible Steel Co. of America, New York, has appointed Pittsburgh Gage & Supply Co., Pittsburgh, to stock and sell Crucible products in eastern Ohio, western Pennsylvania and West Virginia.

♦

Dingle-Clark Co., Cleveland, contracting engineer, has been appointed representative for the John Waldron Corp., New Brunswick, N. J., effective Feb. 1. Dingle-Clark will promote the sale of Waldron gear-type flexible couplings through its offices in Cleveland, Pittsburgh and Philadelphia.

♦

Allied Weld-Craft Inc., Indianapolis, has been organized to take over the business of the welding division of J. D. Adams Co. and J. D. Adams Mfg. Co. P. B. Hall, who has served as manager of the welding division, is one of the incorporators and general manager of the new company, which will carry on the manufacturing and merchandising of the same products as formerly offered by the welding division.

♦

Bridgeport Pattern & Model Works, Bridgeport, Conn., has disposed of its pattern division, which was the original activity of business, and has changed its name to Bridgeport Machines Inc. Management will remain the same, but facilities have been expanded to meet greater demand for turret milling machines, high speed milling attachments and precision spindles.

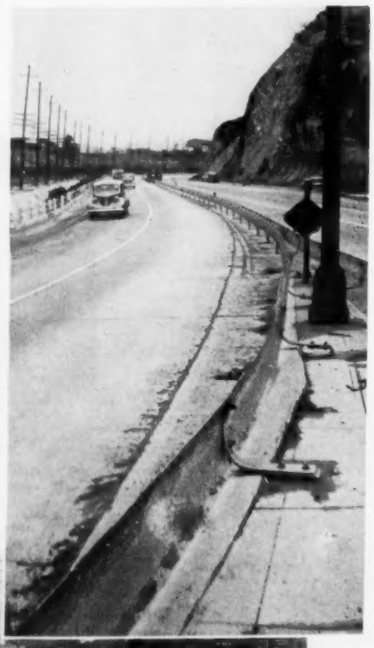
♦

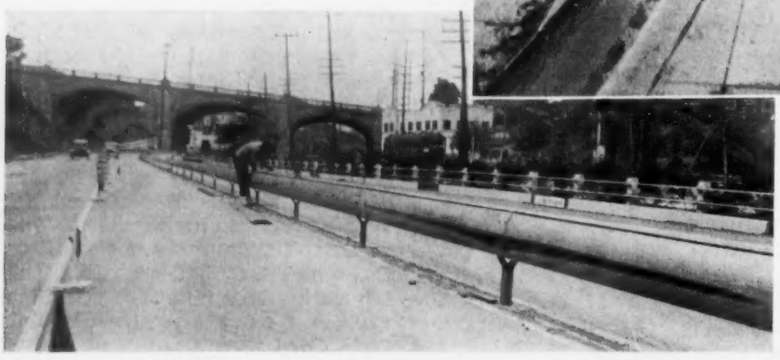
Lake Shore Engine Works, Marquette, Mich., and Service & Supply Co., Iron Mountain, Mich., have merged under the title of the Lake Shore Engineering Works. F. Albie Flodin is president; M. J. Bacco, chairman of the board; W. B. Thompson, vice president in charge of the supply division; L. B. Frazier, vice president in charge of manufacturing; C. B. Madden, secretary, and D. M. Begole, treasurer.

Spring Steel Guards Divide Traffic Lanes

■ Heat-treated, high-tensile steel guards at hub height separate traffic lanes on Ramona highway, Los Angeles. Two lines of convex steel 12 inches wide, back to back 5 inches apart, on posts 4 inches wide and ¾-inch thick embedded in concrete, take no more space than the usual two white lines. Approaching bridge abutments the strips separate and pass each side.

The new divider, designed by United States Spring & Bumper Co., Los Angeles, extends between two bridges 3000 feet apart. Posts are spaced 12 feet on straight road and 10 feet on curves. With tensile strength 165,000 pounds per square inch, and resilient posts, the guard absorbs and diverts impact shock with minimum of damage.





$180,000,000 for Research in 1938

■ INDUSTRIAL and engineering research expenditures in 1938 totaled $180,000,000, estimates *Industrial and Engineering Chemistry*, American Chemical society publication.

For strictly physical science laboratory investigation and development $130,000,000 was spent; for market studies, $5,000,000. Agricultural research and engineering investigations, mainly for national defense, absorbed $43,000,000, or 75 per cent of the federal government's research expenditures.

Industrial research laboratory personnel increased from about 6600 in 1920 to 44,000 in 1938, and there are now 1700 such laboratories.

"In 1938 scientific investigation continued to make available novel and superior constructional materials," says the author, Dr. William A. Hamor, assistant director, Mellon Institute of Industrial Research, Pittsburgh.

"In the United States alone some 70 such products were introduced, and, in addition, the composition and properties of many previously known alloys and other engineering materials were bettered by research work.

"New types of power transmission devices and materials handling equipment were developed. Steel, nonferrous metals, glass, rubber and other manufacturers have shown optimistic management by their research ful attitude and definite planning for recovery."

Many endowments for research were made, including $647,700 to Massachusetts Institute of Technology for work on practical use of sun energy.

American Iron and Steel institute in August estimated expenditures by the steel industry for actual research work in 1938 would total $9,500,000. This compared with $10,300,000 in 1937, when production was much greater.

Weirton Steel To Build $250,000 Laboratory

■ Weirton Steel Co. will break ground about Feb. 1 for a $250,000 laboratory building opposite its general offices in Weirton, W. Va. It will be of steel and brick, 43 x 93 feet. Air filtration will provide healthful working conditions and protect equipment.

Provision will be made for enlarged chemical and metallurgical staffs, increased facilities for quality control of steel and research and technical assistance to customers. All technical departments will be centered in the new building.

It is estimated about 90,000 manhours of employment will be provided, about 50,000 in actual erection and 40,000 in providing equipment and supplies.

"The laboratory will be constructed to allow for future expansion as well as for present needs. We believe it will be one of the most practical scientific workshops in industry," said T. E. Millsop, president.

Industrial Workers Over 40 Years Old Increasing

■ A greater proportion of workers over 40 in industrial employment now than before the depression is revealed by a survey by National Association of Manufacturers. Survey findings, based on questionnaires to 2485 employers of 2,334,538 workers, has been transmitted to Secretary of Labor Perkins.

Questionnaires revealed: Less than 1 per cent of companies give preference to younger workers when it is necessary to make layoffs, and most give preference to workers over 40; no companies discharge workers when they reach 40; 89.1 per cent companies have no maximum hiring age limit; a substantial portion of men hired in 1938 are 40 or more; a larger percentage of workers were 40 or more in 1938 than in 1937.

NAM reported "It is evident from all the information submitted that industry evaluates its older workers very highly. It is apparent that workers 40 and over constitute a vital and dynamic part of the industry."

Foundry Equipment Index Up in December

■ Foundry equipment orders increased in December, for the second consecutive month, according to the Foundry Equipment Manufacturers association, Cleveland. Indexes based on 1922-24 show the following comparisons:

	Dec., 1938	Nov., 1938	Dec., 1937
Net orders	141.8	89.7	111.2
Shipments	102.8	94.5	159.8
Unfilled orders	126.0	87.0	245.5
3 mos. av. gross orders	106.5	85.4	142.4

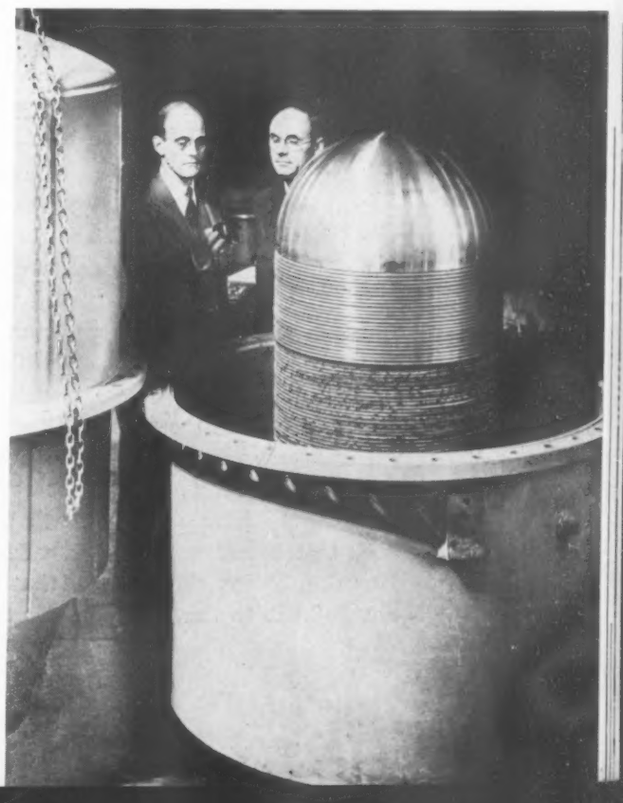
New, Compact 1,000,000-Volt X-Ray Unit; Penetrates Steel Castings 5 Inches Thick

■ X-radiation equivalent to that of about 8½ pounds or $90,000,000 worth of radium, 12 times this country's supply, is produced in a new 1,000,000-volt equipment just completed by General Electric Co., Schenectady, N. Y. Developed for hospital use, it is said to have important industrial applications, including examination of large steel castings, "5 inches or more in thickness."

An outstanding feature is its exceeding compactness. A half dozen years ago it was an achievement to produce an X-ray equipment of 800,000 volts that required a building 62 feet long, 32 feet wide, and 36 feet high, and many tons of lead to protect operators. The new tube is entirely self-contained; grounded metal container housing the unit is 4 feet in diameter, 7 feet high. Complete with its lead protection it weighs only 4000 pounds.

The equipment has a coreless transformer, multisection tube, uses gas, instead of oil, as insulating medium. Transformer and tube are contained in a cylindrical steel tank, consisting of two sections bolted together. In the illustration the upper section of the tank has been removed to show resonant transformer.

The tube, 3½ inches in diameter, 56 inches long, is mounted vertically inside the transformer, in space usually occupied by an iron core. Metal end containing the X-ray generating target projects from bottom of the tank for a distance of 23 inches.



Editorial

Price Fixing Is Not the Way Out

■ INCREASINGLY, of late, a businessman here and there has been heard to express a desire for a return of legalized price fixing. The underlying philosophy is:

Too much governmental control of private industry is a bad thing. But a system comprised 50 per cent of government control and 50 per cent free enterprise is not workable. For government, in one way or another, now controls most cost factors while, at the same time, prices tend toward ruinous levels because of ruthless competition. So, if we are to have government control over costs, let's go the whole way and permit price fixing.

This philosophy, of course, is based largely on nostalgic yearnings for a return of some of the features of the NRA when the price was set forth in the book and heavy fines were imposed on price cutters caught in flagrante delicto. It seems that time has erased the memory of some of the less desirable features of NRA.

Price Fixing Would Bring More Government Control over Business

STEEL does not believe that legalization of price fixing is desirable or that it would bring expected results. For the proponents of price fixing want price fixing as a means for guaranteeing profits—and they overlook the fact that the same government which might permit profits through price fixing might with equal facility tax away those profits. The only result certain under legalized price fixing would be a still greater measure of government control than that now in effect, with no assurance as to how onerous such control might become in the future.

Businessmen will do well to avoid confusion as a result of frequent reiteration of the contention that "We will never go back to the system which prevailed in the twenties." The chances are that we will not go back to that pattern—for the rules governing all human activities are subject to continual change. At the same time, the pattern in which business functioned prior to 1932 was one which had brought to the United States the greatest prosperity the world ever knew. It was set up on an understanding of economic facts based on experience over many centuries. And it incorporated many features which will have to be revived—if the United States is to continue democratic.

Past Experience Reveals Profit Motive as the Needed Incentive

Nobody can quarrel with the statement that the keystone of the system which brought the scale of living in the United States to the highest plane ever known anywhere was the profit motive. Men saved their money and, in the hope of a profit, ventured it in industrial enterprise. The system has been criticized chiefly on the ground that the wealth thus produced was not distributed equitably. Isn't it possible to correct abuses in distribution, if any, without destroying the wealth producing mechanism which has proved so effective?

Instead of inviting complete government control through legalized price fixing, the businessman will do well to enlist wholeheartedly in a campaign of educating the public to the conditions which are necessary in order to promote real prosperity in this country. There should be a universal understanding of the importance of profits in order that more jobs may be created through investment of more capital in industry. It should be clearly understood that rigidity of cost factors, such as unit wage rates, contribute to unemployment. It should be known generally that restrictions that act as brakes on business serve to slow up progress and promote insecurity.

Price fixing is not the way out.

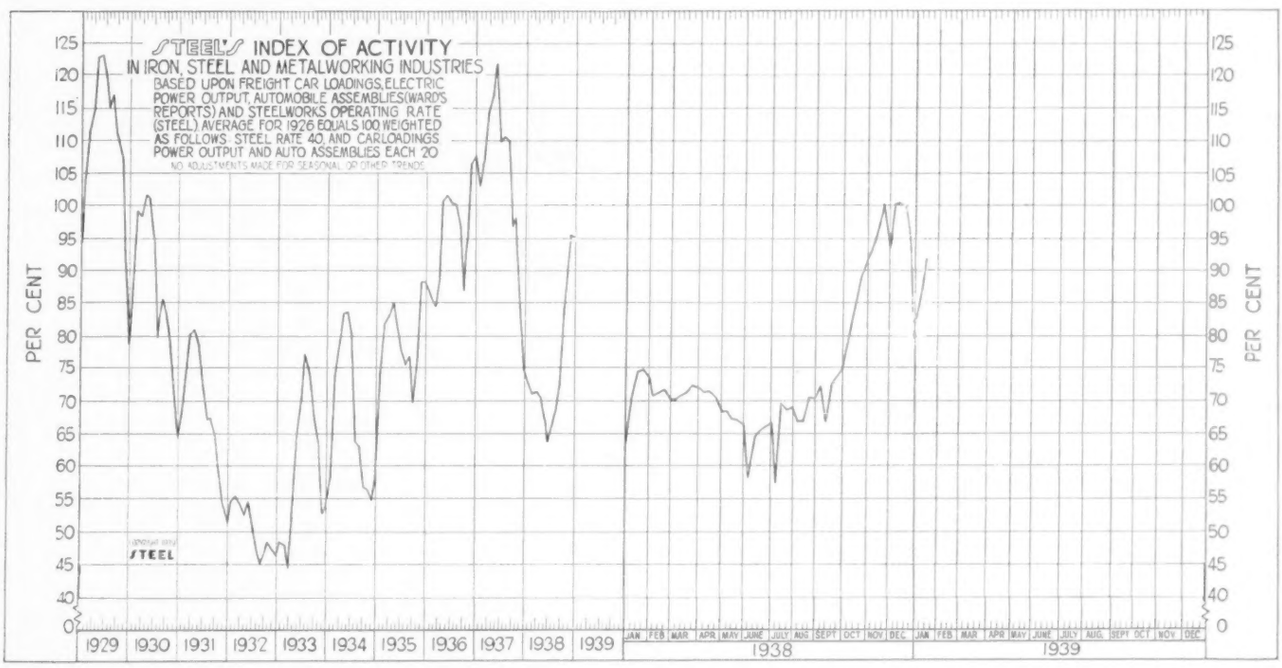
The BUSINESS TREND

Activity Index Records Encouraging Gain

■ ADDITIONAL gains were recorded in a number of industrial barometers during the week ended Jan. 14, the first week this year unaffected by holiday interruptions. Reflecting this condition, STEEL'S index of activity in the iron, steel and metalworking industries registered an encouraging gain of 5.5 points to 92. The present level of activity is substantially higher than a year ago, when the index stood at 74.4.

A seasonal leveling off in industrial activity is anticipated through January and most of February. However, with the anticipated peak in building construction expected this spring and the expected seasonal increased activity in the agricultural and automotive industries, STEEL'S index should remain above the 1938 peak during the early spring months. The role the heavy industries will play in the anticipated spring revival is still undetermined. The transition from a consumers goods recovery to the more stable one of increased activity among the heavy industries is thought closer to a reality than any time in the past few years.

Contributing heavily to the advance in STEEL'S index for the week ended Jan. 14 was the encouraging gain in automobile production. Assemblies in that week totaled 86,925 units, an increase of 10,240 over the output in the week ended Jan. 7 and remain substantially above the


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL). AVERAGE FOR 1926 EQUALS 100 WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
1938
1939

STEEL'S index of activity gained 5.5 points to 92.0 per cent in the week ended Jan. 14:

Week ending	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Nov. 5	93.4	92.3	102.1	88.4	55.0	52.3	48.5	56.0	71.5	98.1
Nov. 12	95.9	86.5	107.9	88.8	54.9	50.7	47.7	55.5	73.0	91.6
Nov. 19	100.4	84.9	109.9	90.9	55.2	52.6	49.2	54.8	71.0	87.8
Nov. 26	93.9	72.7	105.2	86.0	54.4	55.4	44.5	51.4	66.9	80.9
Dec. 3	100.1	81.5	108.4	91.7	51.9	49.7	45.3	52.9	69.2	85.0
Dec. 10	100.7	80.5	113.9	91.8	56.8	52.6	46.6	53.1	68.2	83.4
Dec. 17	99.8	79.4	114.8	91.9	60.6	56.0	49.3	52.3	67.3	79.7
Dec. 24	94.8	69.5	93.3	77.3	64.4	58.0	46.9	46.8	52.3	64.9
Dec. 31	79.9	62.7	96.6	78.2	60.8	53.7	42.9	48.8	58.5	74.3
1939	**1938**	**1937**	**1936**	**1935**	**1934**	**1933**	**1932**	**1931**	**1930**	**1929**
Jan. 7 86.5	70.1	107.8	90.2	65.4	53.6	45.3	55.8	69.2	88.1	94.8
Jan. 14 92.0*	74.4	106.7	89.3	73.8	58.1	48.6	56.2	72.1	91.8	104.2

*Preliminary.

65,735 units assembled in the identical week last year. However, there is no likelihood that production will stage an appreciable gain beyond the 87,000 car-per-week level for the rest of January.

Steelmaking operations gained 0.5 point to 52 per cent in the week ended Jan. 14, and electric power output advanced to 2,269,846,000 kilowatt-hours, a new all-time high for that week. The previous high for the second week of January was in 1937 when power consumption totaled 2,264,125,000 kilowatt-hours. Freight carloadings recorded a more than seasonal gain of close to 60,000 in the week ended Jan. 14. Estimated freight traffic in that week of 590,000 cars compares with 530,849 in the week ended Jan. 7 and with 580,600 in the identical week last year.

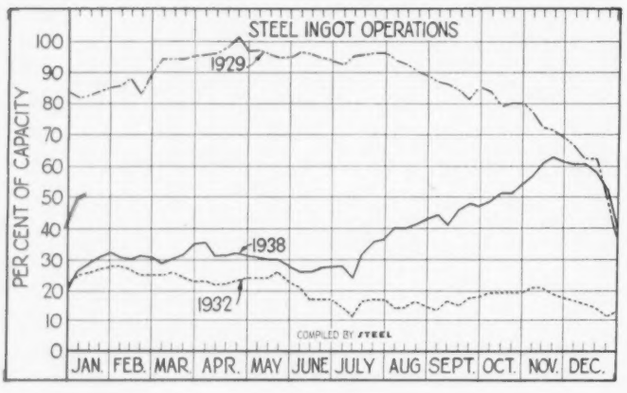
COMMODITY PRICE INDEX LOWER

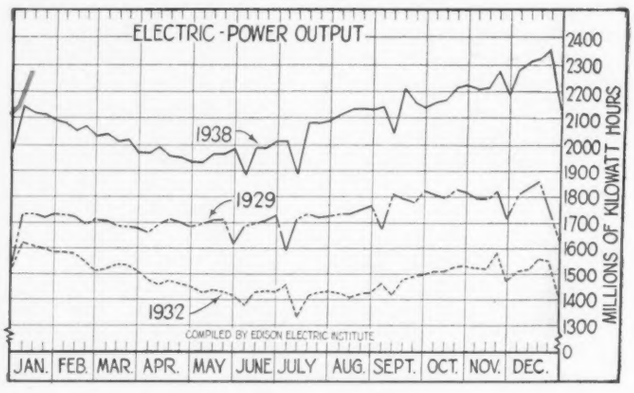
The all commodity wholesale price index of the United States Department of Labor recorded the third consecutive monthly decline during December to reach a new low for the year. The estimate of 76.8 for the price index during December compares with 77.5 in November, 77.6 in October and 78.3 in September. The indicated average of the price index during 1938 was 76.8, compared with the 1937 average of 86.3. The lowest yearly average recorded by the index was 48.2 in 1932, while the highest annual average was 157.6 during 1919. The decline in wholesale commodity prices during 1938 brought to a halt the cyclical rise which got under way during 1933.

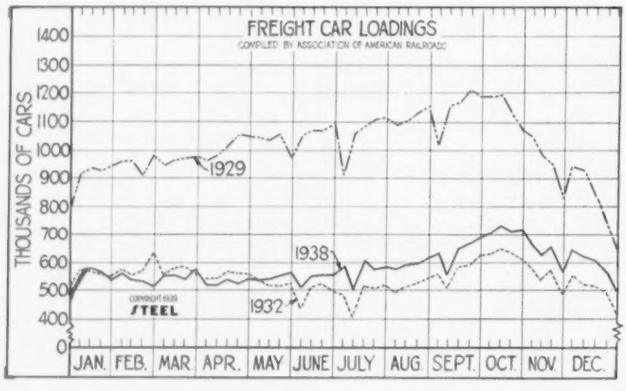
INGOT OUTPUT RECORDS SEASONAL DECLINE

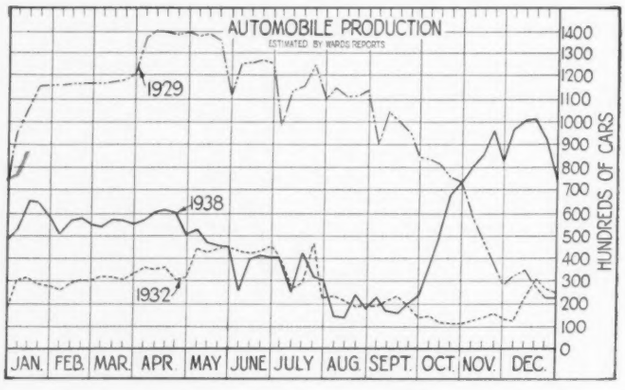
Average daily ingot production in December totaled 120,891 gross tons, according to the American Iron and Steel institute. This compares with 142,889 tons in November and with 56,625 tons in December, 1937. Total production of 3,143,169 tons last month represents a decrease of 12 per cent from the November volume of 3,572,220. Ingot production during December averaged 53 per cent of capacity, against 62 per cent during November and 25.4 per cent in December, 1937.

Steel ingot output in 1938 of 27,838,261 gross tons not only represents a decline of approximately 44 per cent from the 49,502,907 tons produced in 1937, but is also the smallest yearly production since 1934, when output was 25,599,118 tons. Average production during 1938 was at 39.8 per cent of capacity, compared with 72.4 per cent in 1937.





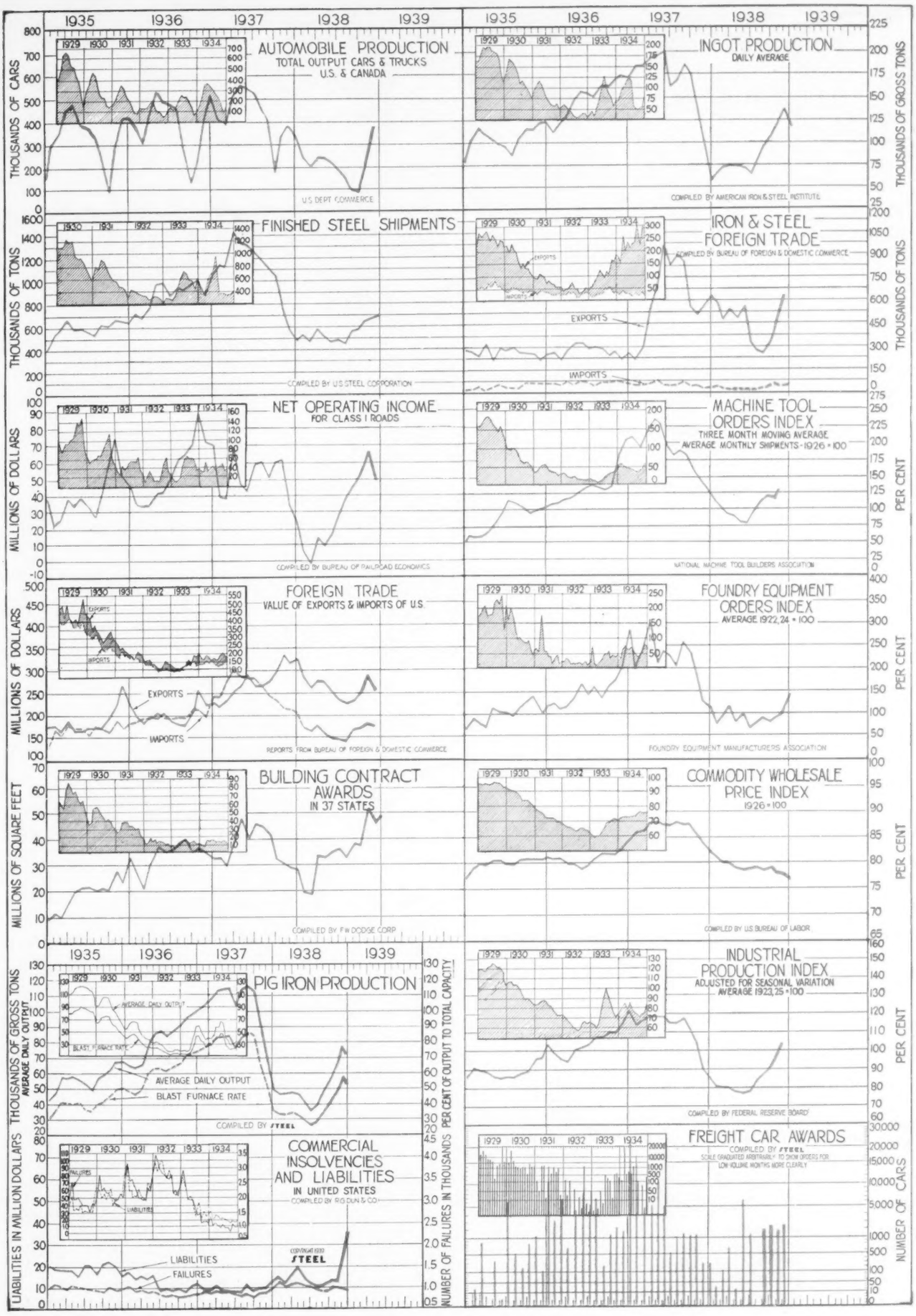




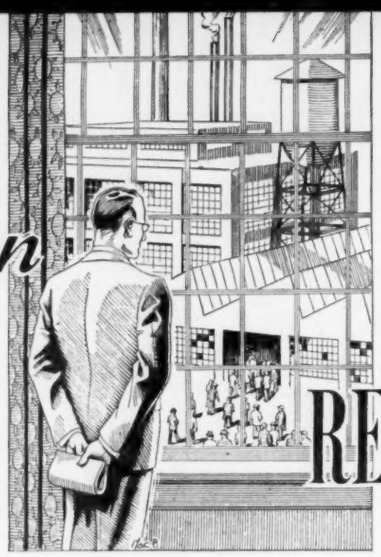
Week ending	Steelworks Operating Rate Per Cent 1938	1932	1929	Electric Power Output Million KWH 1938	1932	1929	Freight Car Loadings Thousands of Cars 1938	1932	1929	Weekly Auto Output 1938	1932	1929
Oct. 15	51.5	19.5	84.0	2,182	1,507	1,806	726	650	1,179	50,540	12,675	82,088
Oct. 22	51.5	19.5	79.0	2,214	1,528	1,799	705	642	1,186	68,360	11,165	81,882
Oct. 29	54.5	19.5	80.0	2,226	1,533	1,824	709	617	1,134	73,335	11,117	76,870
Nov. 5	57.5	21.0	80.0	2,207	1,525	1,816	673	587	1,072	80,030	12,247	73,048
Nov. 12	61.5	21.0	77.5	2,209	1,521	1,798	637	537	1,050	86,300	13,685	61,824
Nov. 19	63.0	19.0	73.0	2,270	1,582	1,794	657	576	983	96,735	16,497	49,160
Nov. 26	62.0	17.5	71.0	2,183	1,475	1,818	562	494	950	84,930	13,389	38,219
Dec. 3	61.0	16.0	69.5	2,285	1,510	1,718	649	547	837	97,795	12,398	28,079
Dec. 10	61.0	15.0	67.0	2,318	1,519	1,806	619	521	937	100,705	21,695	31,255
Dec. 17	58.0	14.0	63.5	2,332	1,563	1,841	606	517	923	102,902	30,589	33,293
Dec. 24	52.0	12.0	63.5	2,362	1,554	1,860	574	495	843	92,890	27,396	23,216
Dec. 31	40.0	13.0	38.5	2,120	1,415	1,638	500	407	638	75,215	25,598	23,967

	1939	1938	1932	1929	1939	1938	1932	1929	1939	1938	1932	1929	1939	1938	1932	1929
Jan. 7	51.5	26.0	25.0	84.0	2,169	2,139	1,619	1,542	531	552	573	799	76,685	54,084	30,755	75,000
Jan. 14	52.0	29.0	26.0	82.0	2,269	2,115	1,602	1,734	590*	580	572	914	86,925	65,735	31,416	95,000

*Preliminary.


AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
EXPORTS
IMPORTS
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACT AWARDS
IN 37 STATES
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY

Forum on RE-EMPLOYMENT



■ WITH THE going into effect of Employment Compensation laws through the United States, a great deal of confusion naturally has resulted, and there has been wide-spread pessimism regarding the effect of these laws on the employment situation.

Believing that the present confusion will gradually clear itself up as the machinery for operation of these laws is perfected and begins moving with some degree of smoothness, STEEL is concentrating in this issue on the employment implications.

We have been fortunate in obtaining an article for this week's Forum from a man who has had much experience with the effect of the employment compensation law in the state of Wisconsin, where it has been in operation long enough for its effects definitely to be known. Clarence B. Bartlett is an industrial analyst with a large clientele in the midwest, particularly among the manufacturers in Wisconsin. He is active in the affairs of William Odom Associates, whose Cleveland office is his headquarters.

Mr. Bartlett stresses the importance of stabilization of employment as an effect of the new Employment Compensation laws, and he makes a number of suggestions as to how the affairs of industry can be regulated so as to benefit rather than suffer under these laws.

—The Editors

■ MORE THAN 1000 employers in the state of Wisconsin will reduce their tax costs under the Unemployment Compensation law by $1,700 on every $100,000 worth of payroll during 1939. This is because these employers have built up their individual reserve accounts to a point where their tax rate has been reduced by 1.7 per cent of their payroll.

At the same time, the state of Wisconsin has a balance to its credit in the trust fund of the Social Security board, as of September 30, amounting to nearly $35,000,000. What effect have the facts behind these figures had upon unemployment in Wisconsin, where the compensation law is not a new thing?

During the months of August and September, the report of the Social Security board shows there were 30,000 initial claims filed in the state, and that in the same months the total number of active claims were on hand averaged something over 100,000.

This would indicate that it is perfectly possible for a respectable percentage of industries so to stabilize their employment that they may hold payments from their reserve funds to a minimum; and also will get the benefit of a lower tax under the experience rating clauses of these laws. At the same time, though the state may be paying out compensation to a large number of legitimate claimants, the total reserve funds of all the employers in the state will be increasing. Every employer with eight or more employes has been effected by the Wisconsin law, and it does not seem that Unemployment Compensation laws, with their tendency to stabilize employment, can be charged legitimately with any great change one way or another in the total number of unemployed in a community.

Wisconsin Is Pioneer

The Wisconsin figures are used to draw this conclusion for the reason that that state's Unemployment Compensation law is the only one old enough to have had compensation paid long enough to permit a measurement of actual results under the experience rating provisions of these laws.

In the attempt to stabilize employment in individual industries, a great deal of work is being done along such lines as: Development of new products; avoidance of rush orders; control of fluctuations in inventory; stimulation of off-season demands; and development of systems of transfer of employes between the departments and plants, and along with this the training of employes for greater versatility of work.

These things definitely tend to increase employed hours of workers

by the year. Therefore, the net effect of Unemployment Compensation laws on employment (always provided that the employes use their best efforts to stabilize themselves) will be in the right direction.

Let us consider the effects of some of these things in specific cases. Take a toy manufacturer. His industry suffers annually a sharp reduction in the demands for its products and consequently in the amount of its employment. Realizing several years ago that this would mean a high cost under the Unemployment Compensation laws, he looked around to see what new products he could add to his line that would tend to smooth out the curve in yearly production. This line would have to suit his machinery, the knowledge of his employes, and the sales organization. Bicycles were added, with the result that today the low point in the curve of yearly production is not due to the falling off of the toy business but is due rather to the falling off of the bicycle business. This manufacturer not only has increased his total production by the year, which means an increased total number of hours worked by the year, but also has materially reduced payments for unemployment compensation.

Regarding avoidance of rush orders, consider this company whose orders almost invariably are for quick delivery. Under practices before the Unemployment Compensation laws, this entailed quick hiring of new help for temporary jobs. Under present requirements, it has been found possible to schedule these orders in such a way that the total hours of the regular force are somewhat increased. This is worked out so that they will not finally be charged with unemployment of crews that are not permanently working for this company.

Control Inventory Fluctuation

Controlling of fluctuations in inventory is another important factor. When a company's budgetary control of inventories is such that it intelligently can forecast the hours that can be used, it is possible—as in a case which I have in mind—that seasonal inventories can be rebalanced so as to keep the hours of employment at a much closer level than otherwise would be the case.

Stimulation of off-season demands is a development that undoubtedly will show results more and more in the future as sales and purchasing departments begin to recognize that costs of unemployment compensation are a direct charge to cost of production and should not be classified in the general tax division of corporated accounts.

Development of a transfer system of employes between the departments and plants and the training of employes for greater versatility of work have great possibilities. During the first quarter of 1938, when the slide to depression levels was at the fastest rate in the history of American business, one company developed this system so that it reduced compensation costs for unemployment by nearly $1,000.00 a week. This statement emphasizes the fact that as individual companies work to stabilize employment, they are working toward more—rather than less—employment for their own regular employes.

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Clarence B. Bartlett
Resident Associate
William Odom Associates, Cleveland

The compensation rate to unemployed people in the majority of states will average 50 per cent of their normal earnings. Therefore it is a fact that for every dollar of compensation saved because an employe is drawing wages, any corporation making possible such results actually is creating two dollars worth of wages for every dollar of compensation which is thus saved.

These conclusions are drawn from the total figures from the state of Wisconsin and from individual results under a wide variety of state laws with merit rating clauses.

It would seem that unemployment compensation laws with the accompanying tendency to stabilize employment at a level in the attempt to reduce the tax costs of these laws will create wages rather than create unemployment.

How to Stabilize Employment

Unemployment Compensation laws call for close study by executives of a great many activities that are normal to American industry. The following suggestions should all be considered from their application to any given individual company's case:

Overcome managerial indifference, inertia and ignorance
Develop new products
Develop new uses and markets for the products
Find a "fill in" product
Give price differentials for advance orders
Maintain demand by lowering price
Break the traditions of seasonal selling
Stimulate off-season demand by advertising
Stimulate slack season demand by introducing novelty
Develop foreign market for slack season
Educate salesmen to the stabilization point of view
Avoid rush orders
Use outside manufacturing capacity in peaks
Minimize seasonal changes, and those in style and design
Sell big customer requirements on annual basis
Anticipate requirements and budget purchases
Make fullest possible use of labor-saving equipment
Interpret sales in terms of production and labor budgets
Conduct supervisory conferences on new ideas and incentives for stabilization and better departmental planning
Increase standardization
Permit fluctuation in inventory
Reclaim waste in dull periods
Carry on new construction in dull periods
Defer repair and replacement of equipment to dull periods
Create "odd jobs" reservoir
"Contract out" peak requirements
Modernize records in personnel department
Make hiring new men more difficult, to reduce unnecessary turnover
Improve methods of selecting and placing employes
Analyze causes of turnover and install preventives
Use "flexible work-week" (with minimum "overtime")
Transfer employes between departments and plants instead of laying-off
Train employes for versatility
Train "emergency" and "flying" squads to avoid temporary employment
Stagger vacations and leaves of absence
Follow-up training program graduates
Utilize retirement plans for superannuated employes
Revise dismissal wage plans

If the foregoing practices are properly balanced in relation to the possibilities of the particular problems being considered, they should result in:

Reduced labor turnover
Force of better trained personnel
Lowered accident rates
Lowered taxes on payroll
Direct savings in unemployment compensation benefits
Lowered overhead from reduced equipment requirements
Lowered manufacturing cost
Better labor relations
Better government relations
Better community relations

HUGE Machine Grinds Work 36" x 480"

Several unusual problems in design and construction were solved successfully in building what is possibly the largest precision grinder yet made

■ A HUGE GRINDING machine, designed for grinding long heavy work, including tapers, to limits of accuracy normally expected from small precision production and tool room machines, was completed recently by Norton Co., Worcester, Mass. Several major problems in design and construction are peculiar to this big grinder because of the length, taper provision and accuracy required.

Also the machine had to be designed and built so it could be disassembled, boxed for ocean shipment, transported to Europe, and there duplicate the precision obtained in tests and demonstrations in the Worcester shop where it was built. It is these unusual features and problems that are discussed here. Design of this big grinder is based on the standard 36-inch traveling wheel type roll grinder. Most of the mechanisms are identical with those on the 36-inch roll grinders of normal length. As these are well known, no description is necessary here.

Design problems not present in shorter grinders include an accurate and convenient means for producing tapers up to 5 degrees of included angle and at full length; furnishing electric power to motors moving over a 42-foot travel without interruption or hazard; and adequately supporting long work from 4 to 24 inches in diameter without deflection. Also it was necessary to develop methods to assure accurate alignment of bearing surfaces of base or bed, which obviously had to be made in sections, not only for machining but also for shipping.

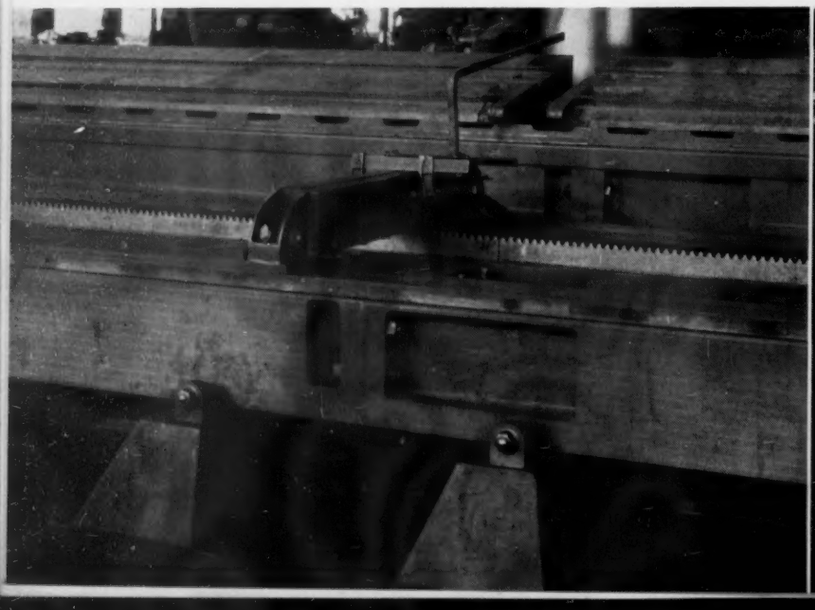
Base, or bed, is cast in two main sections, 30 feet long, 7 feet wide, weighing 52,000 pounds each. Placed end to end, these sections support the swivelling work table and the traveling table with grinding wheel and controls. Main base sections were planed and ends milled. Two additional smaller sections complete the base and extend width of the work table supporting surface at one end.

After machining, main sections were placed on 43 pedestals, each provided with a leveling wedge and adjusting screw. Main sections were placed end to end and just far enough apart to permit a man to work on joint surfaces with scraping tools as these ends had to be scraped perfectly square with the sliding way surfaces. Squareness of the ends was tested with a dial indicator gage attached to an arm on a perfectly round shaft lying in the V-way of the base. Swinging this arm through an arc checked squareness.

The two base sections were then drawn together, leveled in line and secured by bolts and taper pins which were drawn tight by nuts. These pins establish the joint and insure correct reassembly. Fig. 1 shows completed joint.

Next it was necessary to level the base as a unit to permit a minimum of scraping to make the ways and bearing surfaces straight, flat and parallel. Here a cast iron bridge with bottom surfaces machined and screwed to fit the sliding way surfaces was used. Top surface of bridge was made absolutely level when resting on correct base ways.

Fig. 1. (Left)—Base and table joints are held by bolts and taper pins. Fig. 2. (Right)—Right end of the base is widened by these auxiliary sections bolted in place



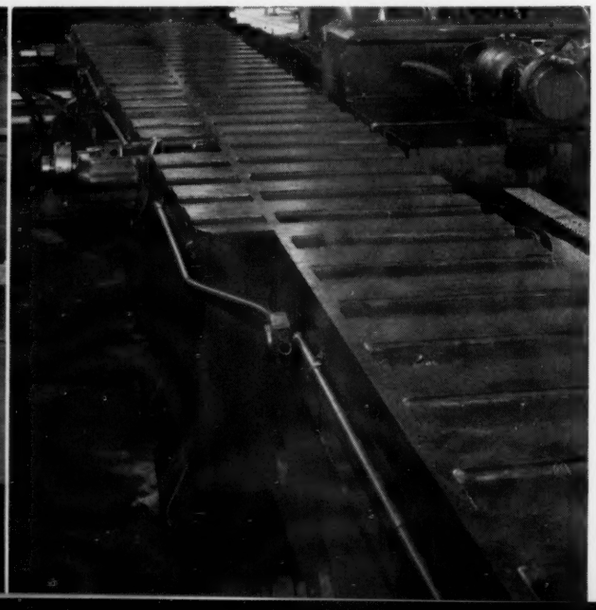


Fig. 4. (Upper)—Norton Microliner is being used here to test straightness of V-way. Fig. 5. (Lower)—Here a dial indicator gage is being used to check height of base

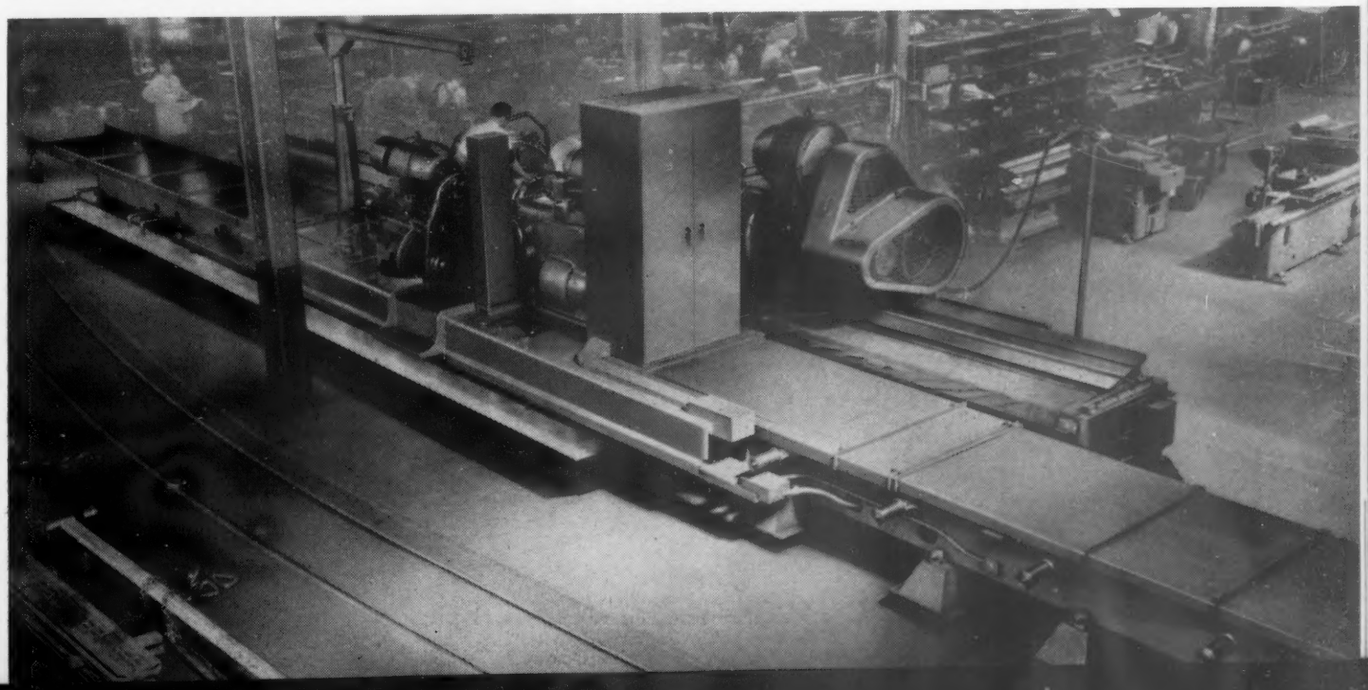
A precision spirit level placed on top of the bridge then indicated errors in the relative height of the two base ways as the bridge was moved along the ways.

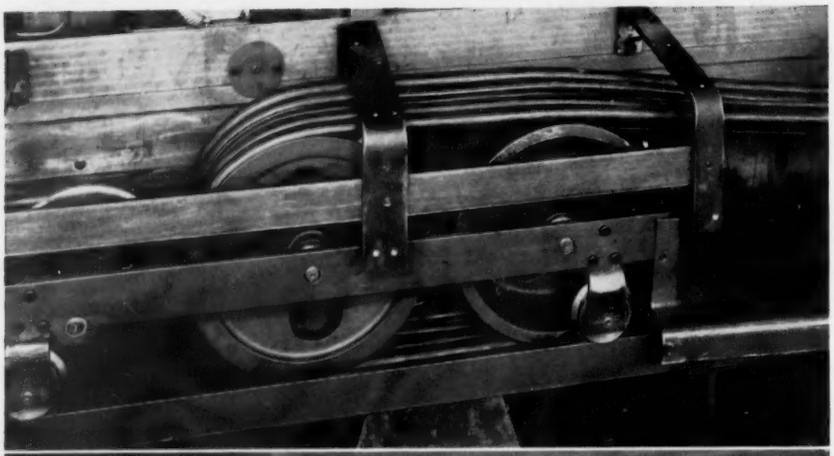
Wedge-shaped auxiliary base sections next were added to widen the main base. They were located by machined keys and attached firmly by bolts and dowel pins. With the base assembled, leveling was again checked and adjustments made for any possible change caused by the additional weight of the auxiliary base sections. After this final leveling, all corrections for level and alignment were handled by scraping the surfaces. The flat way along rear of base was first scraped flat, level and as straight as possible using a 14-foot straight edge and precision level for testing. V-way was then scraped to a master form and tested for vertical accuracy using a spirit level on the bridge.

To insure perfect straightness of the V-way, a Norton Microliner was used. This device, Fig. 4, consists essentially of a microscope mounted precisely in a vertical position on the testing bridge and directly over a fine music wire stretched taught from end to end of the base. Wire was adjusted at end anchoring clamps so identical readings of wire on graduated scale of microscope optional field were obtained at each end of the base.

When bridge was slid along the base ways and readings taken every few feet, any variations in the readings indicated curvature of the V-way, subsequently corrected by

Fig. 3—General view of complete machine as seen from the rear side





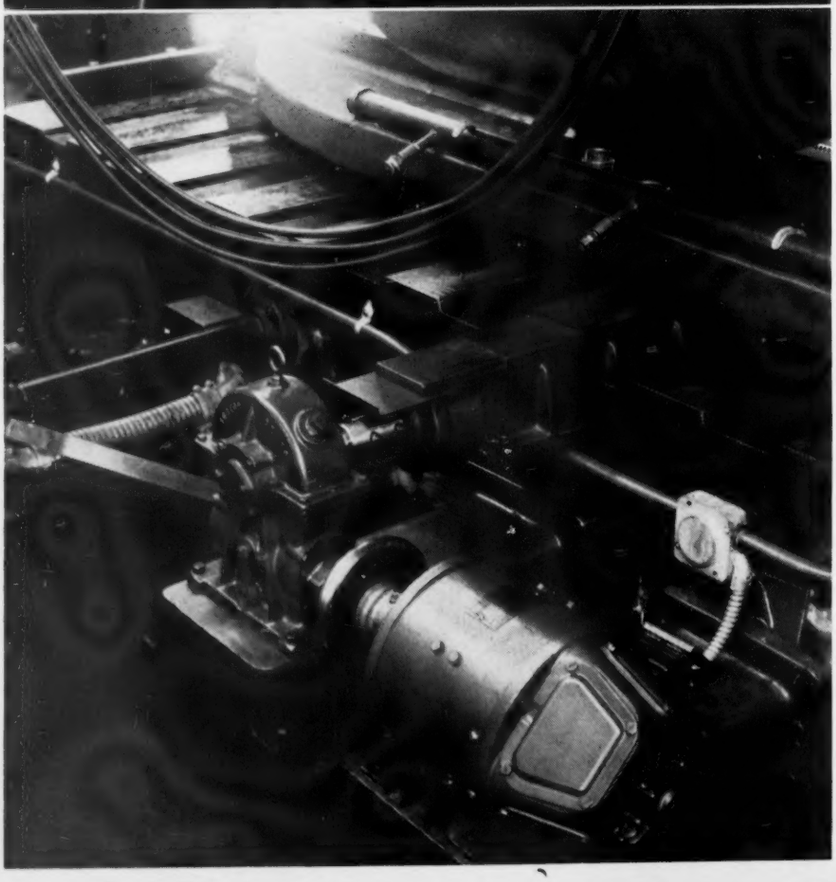


Fig. 6. (Top)—Electric power cable carrier truck with covers removed. Fig. 7. (Center)—Steadyrest in use while grinding long shaft. Fig. 8. (Bottom)—Motor and drive mechanism used for swiveling table when tapers are to be ground

scraping. Straightness of V-guide way is of utmost importance as it determines straightness to which work can be ground.

Next, top of front portion of the base on which the work table rests was scraped flat, straight and parallel with the ways. Testing for uniform height of this surface was accomplished with the dial indicator gage mounted on the testing bridge as shown in Fig. 5.

Scraping bottom surface of the swivelling work table sections and scraping traveling table to fit the base ways presented no unusual problems. When completed, erection of the grinder proceeded in the same manner as shorter machines. Top surfaces of the work table on which the headstock, footstock and steadyrests are mounted were then scraped straight and parallel using the indicator gage attached to the testing bridge for checking.

Work Table Swivels

Of the unusual design features previously mentioned, the dual adjustment of the swivel table for taper grinding is perhaps most interesting. Work table swivels about a pivot set in top of base near the right or footstock end and fitted to a hole in the underside of the table. Movement of the table is accomplished at the left or headstock end by a screw revolved by a 3-horsepower motor and speed reducer. The screw turns in a nut attached to underside of table. Setting for the desired angle is by a graduated scale on a gib at the end of the table, provided with a vernier reading to 0.1-millimeter per meter taper on the diameter or 1/100 of 1 per cent. Push button control for the swivelling motor permits "jogging." A still finer adjustment is obtained by turning a handwheel on the shaft between motor and reduction gear.

An auxiliary screw near table center is attached to table underside and fitted with large lock nuts. This permits any deflection of the table, caused by end movement, to be rectified. A second scale and vernier in connection with this adjustment permits extremely accurate angular setting when correct and duplicate readings of the two vernier scales are secured. When lock nuts on the screw are tightened, a safety switch automatically renders inop-

(*Please turn to Page* 43)

Builds Large Hammer

With 6-foot stroke and 35-ton hammer, new unit is expected to make possible improved practice in connection with forging aluminum alloy propellors and crankcases for airplanes

By MacDONALD S. REED
Chief Engineer
Erie Foundry Co.
Erie, Pa.

■ WHAT IS said to be the largest drop hammer ever built was recently completed by Erie Foundry Co., Erie, Pa. It will be used in England to forge airplane propellors and airplane engine crankcases for British aircraft of all types, using aluminum alloy material. Its development is significant since it permits progressive forging of larger pieces than heretofore possible.

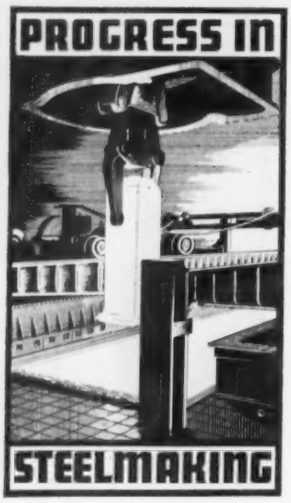
Hammer is 27 feet in height from floor line to top of cylinder after installation. Sub-anvil structure extends 12 feet 9½ inches below floor level to rest on its own foundation anchored to bedrock. Sub-anvil is in two pieces, each weighing approximately 234,000 pounds. The super-anvil, supporting the gigantic frames above the floor line, is in two pieces, each of these weighing about 200,000 pounds. Accompanying illustration shows only that portion above floor level.

Weight of ram, piston rod and piston is 50,000 pounds. Add to this the top die and the total reciprocating weight increases to more than 70,000 pounds. Diameter of cylinder is 39 inches, stroke of piston is 72 inches. Piston rod diameter is 11½ inches. Space between guides is 50 inches and ram is 80 inches from front to back. Force exerted against work being forged may run into the hundreds of millions of pounds, probably the largest mechanical force ever available for useful work.

Control mechanism is so accurate that the ram may be brought within a fraction of an inch of the dies at full speed and stopped there. The control is a combination of the usual foot treadle with a hand lever arrangement. Even though the material being forged is aluminum, weight of parts will average several hundred pounds and more than one man will be required to manipulate the work. On this machine there will be one operator who will do nothing but control the hammer. Using combination hand lever and foot treadle the operator has precise control of length of stock and also velocity of the ram the instant of impact. While the ram is still moving downward he can tramp here below the piston to cushion the blow in the cylinder rather than exert full force against the work. Also he can at will strike a dead blow in which the ram continues to press down on the work with its weight

(*Please turn to Page* 43)

Huge forging hammer shown here is so rigidly constructed that it can be used with progressive dies and work placed in impression at extreme edge of die. Lifted and driven down by air pressure, this hammer strikes a blow exerting tremendous pressures



Dual Limit Control

Heat control system protects both radiant tubes and steel charge. New continuous gas analyzers may regulate combustion automatically, providing different atmospheres for various portions of heating cycle

By J. L. WHITTEN
Lee Wilson Engineering Co.
Cleveland

■ DEVELOPED for electrically heated pot furnaces some years ago, dual limit control in heat applications essentially serves to supply element protection and elimination of over-coasting in the pot. Although the idea was never carried out in fuel-fired furnaces until recently, the reasons for its use are no different. Advent of the radiant-tube furnace with its metallic firing tubes necessitated a check on tube temperatures. There are other applications as in soaking pits where the dual control is necessary for roof protection as well as steel protection.

At the present time some 65 or 70 installations on radiant tube fired furnaces have been made, most of them on Lee Wilson furnaces. In all cases the performance has been extremely satisfactory.

Heat Generated by Tube Firing

In a furnace of this type the heat is generated by tube firing. Tubes must not be too high in temperature to protect them from early destruction and to prevent over-heating edges of the steel charge to cause stickers in the coils or flat pieces. Also it is most desirable to have a constant heat head on the radiant tubes as quickly as possible to heat the charge as rapidly as heat can be absorbed. The other, and possibly the most important limitation is that once the steel has reached its control temperature it should not exceed that point. Tubes at that time should start to reduce their temperature.

Various combinations were tried with steel temperature control and with a limiting check on the tubes, but all indications pointed to the necessity of controlling both variables, that is, both tube and steel. If both were to be controlled at the same time, the fault found in the earliest type of this dual control, wide hunting on the part of the heat input would be present. Thus a natural development was to control the tubes to limit them until the steel had reached its control point, and at that time to switch over automatically from the tube thermocouple to the steel thermocouple, which would maintain the desired steel temperature while the tubes continued to fall in temperature during the soaking part of the cycle.

This first was developed with two instruments and then combined into one, which also includes the ability to allow the control to recycle or revert to tube temperatures if for any reason the tubes become excessively hot. This recycling can function indefinitely as long as it is necessary for a transfer of control point. Above all of the control functions, an extra limit was placed to either cut the fuel to a minimum position or shut it off entirely if this limit were reached. On large furnaces, this limit may be worked from several points near the tubes.

This control system functions to maintain tube temperatures without hunting until the steel reaches its control point. At that time the control is automatically transferred to the charge. Unless there is a disturbance or further re-setting of control points, the charge will be maintained at a constant temperature until complete uniformity is developed through it.

This type of control has been designed to function with a proportioning control mechanism which allows the full benefit of the diminishing radiant column in the firing tube to be applied to the charge. Thus the curtain of heat around the charge is gradually lowered as full penetration and uniformity are developed.

This type of control has been used on Wilson rectangular and circular bell furnaces with equal success. We believe such control presages a general rearrangement of thought in control applications on all types of furnaces. This control functions equally well on flat sheets, round coils of strip, tin plate or wire charges. Since the control point in all cases is at the top center of the charge, piling height is automatically compensated by position of control thermocouple.

Analyzes Deoxidizing Gas

There is equipment available which can be used to run a continuous analysis on the reducing properties of deoxidizing gases used in furnace atmospheres. It determines constancy in analysis and serves as a check on the machines generating these particular atmospheres. By means of these recorders, the gas generating machines can be set to give maximum performance in providing a gas that will preserve the finish with which the steel enters the furnace and thus preventing any further decarburization.

On direct-fired furnaces, this same type of atmosphere analysis is being found quite as useful where it directly registers quality of gases in immediate contact with the steel

Abstract from paper presented at Instruments conference, Carnegie Institute of Technology, Pittsburgh, October, 1938.

as created by active combustion in the furnace. By progressive zone analysis, certain areas in the furnace producing atmospheres damaging to the steel surface can be isolated and then corrected.

The possibility of applying this apparatus to automatic combustion regulation is not beyond reality; in fact, several companies have been experimenting for the past several years on exactly this type of installation. So in the not too distant future it should be possible to obtain equipment which will automatically regulate furnace atmospheres and even do this on a definite program set up to provide different types of atmosphere at different times during the heating cycles.

As far as the art of automatic regulation has advanced, it is still considered to be in its infancy. Industry is ready to absorb the equipment for all of these control applications as soon as the manufacturers of the equipment have it developed to a practical point.

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Huge Machine Grinds Work 36" x 480"

(*Concluded from Page* 40)

erative motor control at the end so no power can be applied to deflect or damage either table or screw.

A cable carrier for the power supply overcomes the disadvantages of bare wires and sliding contacts. Six power cables enter a long steel trough attached to the rear of the base and are anchored to one end of this trough. These cables pass around a pulley on a traveling truck and back to the right end of the traveling table. Anchored here, they enter conduits leading to the motors and control apparatus. A wide fabric conveyor belt, anchored at the same points, parallels the cables and passes around a drum near the pulley on the carrier truck to support the cables and relieve them from tension.

To keep the conveyor belt tight and the cables straight, a steel cable is fastened to the left end of the trough, passes over a small sheave on the carrier truck, is pulled tight and fastened to the left end of the steel housing on the side of the traveling table. See Fig. 6. Truck moves on its rails only when the table moves and then its travel is just half that of the table. Conveyor belt, power cables and steel cables are always straight and parallel whatever the position of the carrier truck.

Ten steadyrests provided for grinding long work are equipped with bronze shoes to support shafts from 4 to 24 inches in diameter. Shoes are pivoted so they will adjust themselves to tapered work. Each steadyrest, Fig. 7, receives coolant pumped through a mechanical type filter from the main tank in the machine foundation. Hose connections along the coolant pipe line, which extends the length of the work table, permit connecting steadyrests where desired.

Adjustment of both upper and lower work shoes can be made by the operator from his normal position on the traveling table by handwheels on extended shafts operating the shoe adjustment through sprockets and chains.

To obtain perfectly smooth work surfaces where tapers join straight cylindrical portions, or where two tapers of different angles join, a device is incorporated for truing the face of the grinding wheel at angles corresponding to the two adjoining work surfaces. A small forming bar attached to the grinding wheel guard can be set conveniently to the desired angle. Traverse of the table causes the diamond holder mounted on the footstock to move in or out due to contact of a shoe held against the forming bar. A portion of the wheel face can thus be trued parallel with the forming bar while the other part of the wheel face is trued parallel with the table travel, the diamond holder being locked in a position so the shoe does not contact the forming bar.

•

New Forging Hammer

(*Concluded from Page* 41)

plus all the force of the air in the cylinder, or he may strike a blow in which the top die is in contact with the work for only an instant. In demonstrations, the shell of the walnut has been cracked between the dies without damaging the meat of the nut. An improved throttle control device is used which serves to regulate the opening of the throttle or admission valve for any definite position of the foot treadle mechanism.

Hammer is built to utilize progressive dies in which the work may be placed in an impression at extreme edge of die, as the hammer is rigidly constructed. In actual operation it is not expected that much work will be done with progressive dies due to the size and character of the parts being formed.

Making drop forgings from aluminum alloys will be the principal use made of this hammer. Probably the largest proportion of the work will be in production of airplane propellor blades and crankcases for airplane engines of the fixed radial type.

In normal operation the hammer will strike 30 to 80 blows per minute, depending on length of stroke and force required. However, 20 to 30 blows will probably be the average struck at one heat on one forging.

For one class of work maximum die area will be 24 inches wide and 120 inches long. On other work maximum die face will be 50 inches square. The hammer operates on compressed air and is double acting; that is, air is admitted above the piston to drive the ram down at high velocity as well as to lift the ram to the elevated or striking position.

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Electrons Provide Means Of Measuring Metal Wear

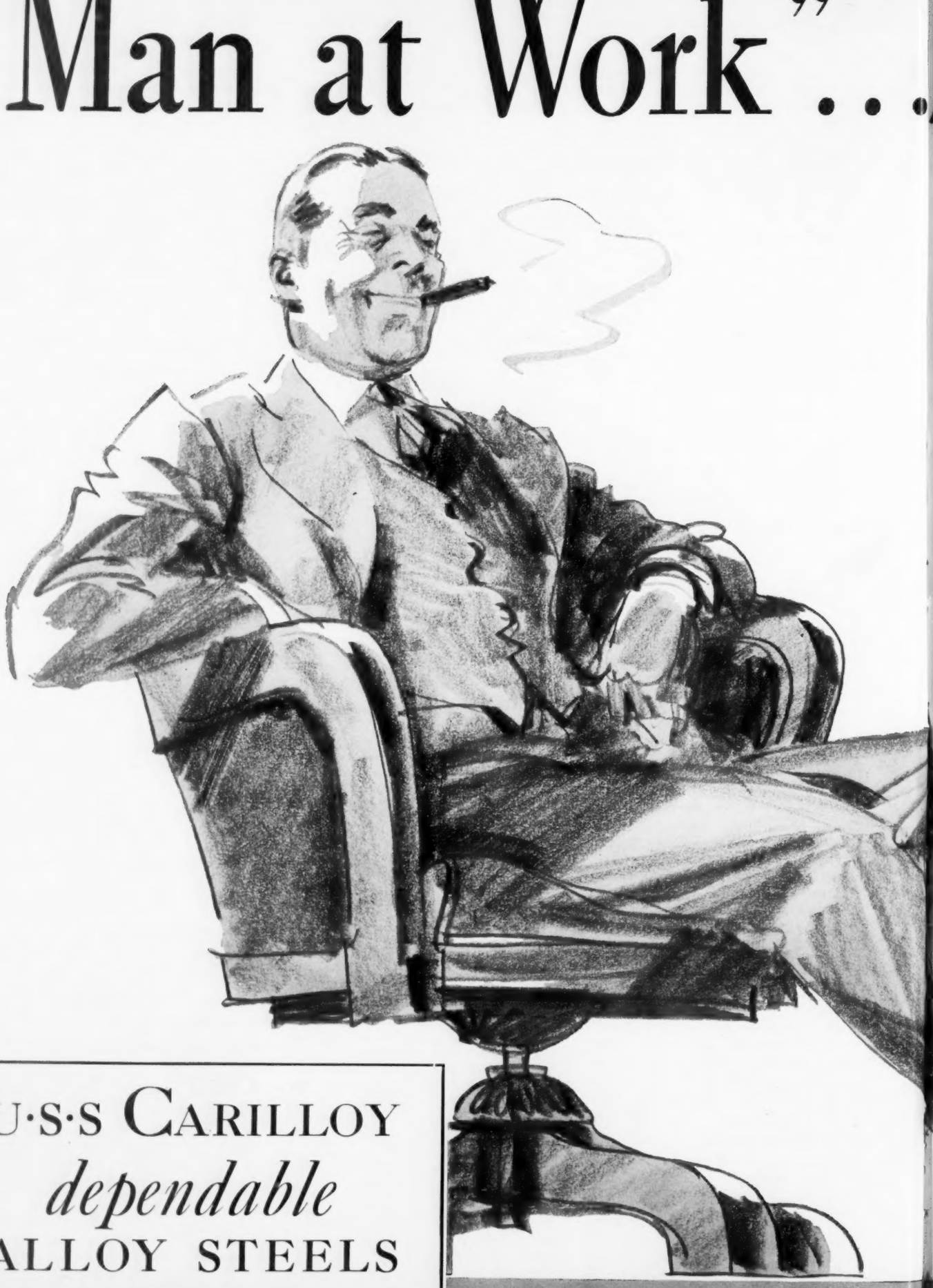
■ A unique means of predicting mechanical wear of metals, known as the electron-diffraction method, was described by L. M. Tichvinsky, research engineer, Westinghouse Electric & Mfg Co., East Pittsburgh, Pa., at a recent meeting of the American Society of Mechanical Engineers in New York.

This method is said to be well adapted to studies of mechanical wear because, unlike X-rays, electrons are deflected easily by the atoms in any aggregate of matter on which they impinge, and their penetration is limited to the surface layers.

In practice a beam of electrons moving at a speed about half that of light is bounced off the surface under examination, and the direction of the diffracted rays leaving the surface is recorded photographically as a so-called electron-diffraction pattern. Since these diffractions are determined by the manner in which the atoms are arranged in the surface layers, structure of the surface may be determined from the diffraction pattern.

This engineer is shown running a test in determining the mechanical wear of metals by the electron-diffraction method

"Man at Work" . . . *S*



U·S·S CARILLOY
dependable
ALLOY STEELS

UNITED S

. . Saving his company an extra $3,000 a year!

WITH a nice letter from the Big Boss on his desk and a fatter pay check very much in prospect . . . no wonder he feels a little pleased with himself.

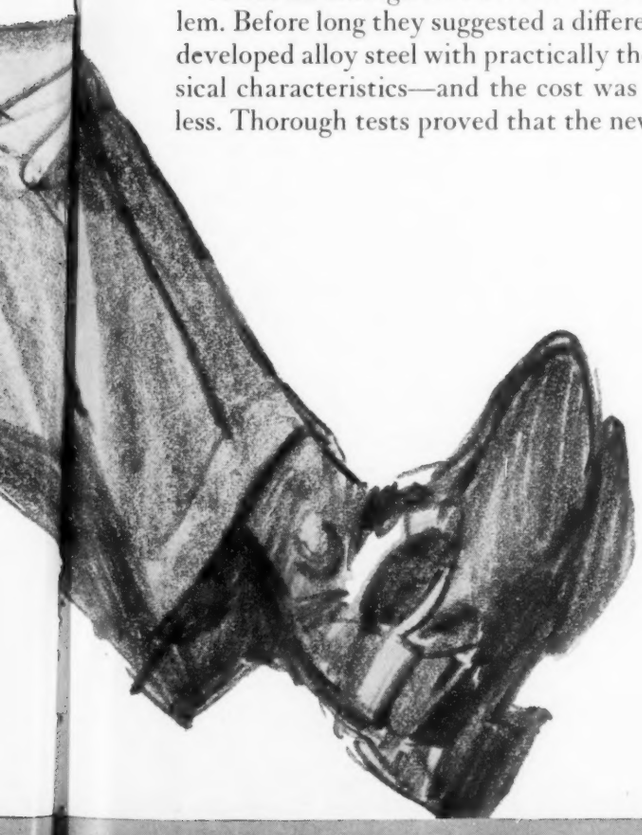
Six months ago when we suggested to this chief engineer that a change in steel specifications might save him considerable money, he almost shooed us out of the office. His concern makes automotive parts, shafts, knuckles, arms and bolts. His product has always been among the best, has always performed satisfactorily in service. He was using a well-known alloy that was apparently the best for the job. Costs were right in line with competition. You couldn't blame him for being skeptical.

But he told us to go ahead and show him what we could do.

So our metallurgists started to work on the problem. Before long they suggested a different, recently developed alloy steel with practically the same physical characteristics—and the cost was $3.00 a ton less. Thorough tests proved that the new steel gave equally reliable service, processed and machined just as readily. Adopted in place of the higher priced steel, this slight change in specifications is effecting an initial saving of about $3,000 a year. It has also led to a reconsideration of the steels used for other parts on which savings are expected to run close to $50,000 yearly!

Though we are not at liberty to give names and places, the circumstances and figures quoted are absolutely authentic. We believe they are significant to every steel user. Especially so because these savings were made in a thoroughly modern plant where special care and attention has always been given to the selection of steel used. In this case, our metallurgists were able to suggest a more economical steel merely because of their intimate knowledge of the constantly changing alloy steel picture. With new steels being developed right along, it's easy enough to overlook what may be exactly the right steel to do the job for you at a lower cost.

To make certain that you are not passing up such savings, the service of our metallurgical contact men is offered you. These men are specialists in made-to-measure steels. They know how these special steels act in fabrication, how they perform in service and particularly how they affect ultimate costs. Their sole aim is to help you fit the *right* steel to the need for it *at the lowest cost to you.*



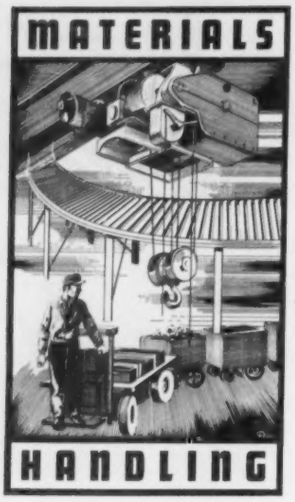
CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh · Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Products Company, New York, *Export Distributors*

USS

D STATES STEEL



Gasoline Pumps

A plant specializing in production of gasoline pumps for service stations uses a large number of roller conveyors in manufacturing, assembling and finishing operations. Flexible arrangement permits storage on lines without interrupting flow

■ MANUFACTURE of gasoline pumps at the plant of Wayne Pump Co., Wayne, Ind., is distinguished by a carefully worked out flow of material from the time it enters the plant until the finished units are shipped.

The accompanying layout diagram indicates roughly the various departments and operations involved. The press shop where the sheet steel corner posts, side panels and various other sheets steel parts are formed is alongside the storage area in which steel sheets are kept.

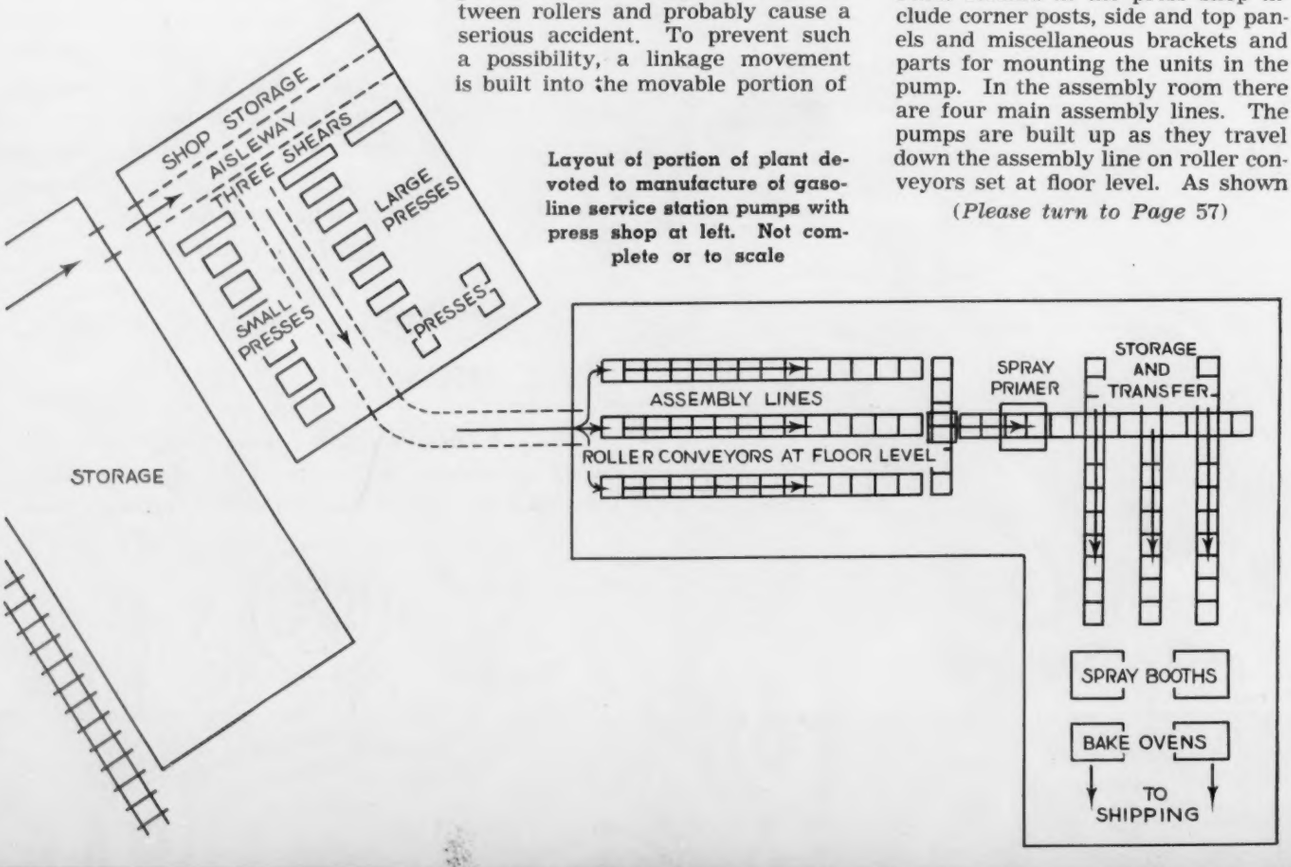
Unloading dock extends the length of this room parallel to a railroad siding which adjoins the building. Steel sheets are unloaded from cars to the storage areas or in a large number of cases directly into the press shop, as a certain amount of stock is maintained in the press shop at all times. Sheet unloading operations are handled on portable roller conveyors which are set up to deliver the sheet where wanted. When material is to be stored in the press room, it often is unloaded directly from the cars onto a roller conveyor which carries it directly to the press shop.

An interesting feature in connection with these portable roller conveyors, which are gravity operated, is the incorporation of a safety catch at aisleway sections where a portion of the conveyor is hinged so it can be lifted to permit passage of trucks and workmen. When a sheet is placed on the conveyor with the aisleway section in a raised position, it ordinarily would go between rollers and probably cause a serious accident. To prevent such a possibility, a linkage movement is built into the movable portion of the conveyor in such a manner that a series of bars rises in the path of the sheet in front of the open section. Operation of this device is entirely automatic as it is mechanically linked with the hinged portion of the conveyor. Thus safety is not dependent upon the workmen remembering to operate the safety mechanism.

In the press shop, several large shears are located near the stock to handle shearing operations prior to stamping and forming. The large blanking and forming presses are arranged in a row to facilitate handling of material as much as possible.

From the press shop, material goes to the assembly lines in the adjoining building as shown below. Parts formed in the press shop include corner posts, side and top panels and miscellaneous brackets and parts for mounting the units in the pump. In the assembly room there are four main assembly lines. The pumps are built up as they travel down the assembly line on roller conveyors set at floor level. As shown

(*Please turn to Page* 57)



Layout of portion of plant devoted to manufacture of gasoline service station pumps with press shop at left. Not complete or to scale

for a thorough review of modern handling methods

by all means, see . . .

Giants at Work

—a newly released sound motion picture which shows how the new storage battery industrial trucks do everything that a giant man could do. They pick up and set down their many-ton loads, regardless of shape or position, with virtually the same speed and dexterity of which a giant human hand would be capable.

20,000 miles of travel was necessary to film the numerous recent installations shown in "GIANTS AT WORK!" You can save yourself this long journey. Simply write or telephone our nearest district office for a showing of "GIANTS AT WORK." It will be screened for you—at your convenience.

BOSTON NEW YORK PHILADELPHIA WASHINGTON PITTSBURGH BUFFALO CLEVELAND CINCINNATI
CHICAGO DETROIT ST. LOUIS INDIANAPOLIS DENVER SAN FRANCISCO SEATTLE

EDISON

STORAGE BATTERY

DIVISION OF THOMAS A. EDISON, INC. WEST ORANGE, NEW JERSEY, U.S.A.

Unionmelt Welding

Here is a comparatively new process offering first quality welds made automatically at extremely high speeds. Butt joints in 3-inch thick material are made in one pass. Speeds up to 165 feet per hour in 3-16 inch plate are obtained

■ AN AUTOMATIC electric welding process particularly adapted to joining heavy material and making long welds on a production basis, developed by The Linde Air Products Company, Unit of Union Carbide and Carbon Corporation, New York, now is used commercially in welding steel from 16-gage to 3 inches thick in a single pass at speeds ranging from 3 to 80 inches per minute. Thick material may employ two or more passes. Depth of weld is not limited theoretically. Practical restrictions, however, set present maximum current values at about 4000 amperes.

This process, called Unionmelt welding, produces welds of exceptionally high quality and strength at considerable savings in time and materials. It employs a special welding head to feed bare welding rod and a granulated material to the work, the latter permitting the use of extremely high amperage with accompanying high speeds and efficiencies. This granulated welding composition or melt is patented and is sold under the Unionmelt trade-mark. It is usually called Unionmelt, or simply "melt." A typical melt is formed from silica, lime, magnesia and alumina. All melts are substantially free from uncombined iron oxide and materials which gas at welding temperatures. Fig. 1 shows section through a Unionmelt weld.

Unionmelt welding has been applied successfully to low and medium carbon steels, high strength steels, stainless and other alloy steels. It also appears suitable for various nonferrous metals and alloys. The process is distinguished by the fact that the welding zone and electrode end are constantly covered by the granulated melt. Although highly resistant when cold, the melt material conducts electricity when in a molten state. The granulated Unionmelt is laid down progressively along seams to be welded. A "fuse," such as a ball of steel wool, is used to start the weld since the Unionmelt when cold is not a conductor of electricity. The heat of welding causes part of the layer to become molten. All welding action takes place beneath this blanket without visible arc, sparks, spatter, smoke or flash. As the weld cools and hardens, the molten portion of the welding composition solidifies into a solid, glass-like slag which cracks off in relatively long pieces on further cooling. The granulated Unionmelt is fed by gravity as the head moves along the seam. An adjustable device automatically determines the amount. Start of welding is shown in Fig. 2.

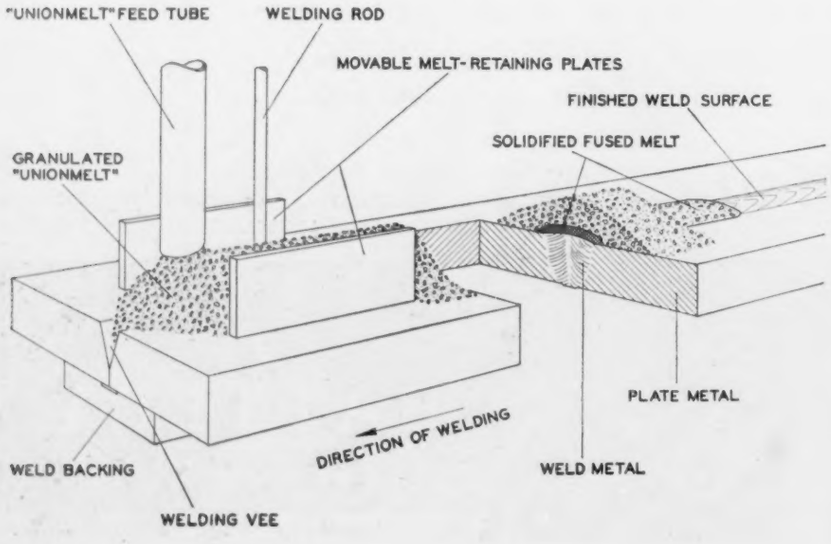


Fig. 1—Sketch showing how Unionmelt weld is made

Wire Feed Is Preset

Speed of welding wire feed is governed by automatic controls preset by the operator to maintain the desired welding voltage. To make certain that molten base metal and welding rod end are completely covered, an excess of the composition is applied, the unfused portion of which is usually recovered through a separate vacuum recovery system since it may be used again.

The welding composition performs several functions. It makes possible the use of higher current densities and therefore the rapid generation of intense heat in the welding zone. While not strictly a flux, the material acts as a cleanser, washing the metal which melts from the rod and absorbing impurities from the fused base metal. Atmospheric and other gases are excluded. Consequently the fused weld metal is exceptionally clean and dense with excellent physical properties.

Special alloying elements can be

Table I

Maximum Currents Butt Welds

Thickness inches	Current amperes
¼	825
½	1,175
¾	1,300
1	1,600
1½	2,000
2	2,900
2½	3,200
3	4,000

Maximum Currents Fillet Welds

Nominal size inches	Current amperes
¼ (3/16)	450
⅜ (5/16)	650
½ (7/16)	800
⅝ (½)	900
¾ (⅝)	1,000
⅞ (11/16)	1,200
1 (13/16)	1,500
1¼ (1)	1,600

added to the Unionmelt to produce weld metal of special analysis, but generally welding rod of the required analysis is used.

Butt welds, fillet welds and plug welds can be made with any desired practical penetration and contour in commercially used thicknesses of material. The process is especially advantageous where the operation is repetitive and where welds can be made with the surface approximately horizontal, although if welds are not too large the welding head may travel either up or down at angles up to 15 degrees without lowering efficiency. Fig. 3 shows sections of a number of different kinds of welds. All show excellent peneration.

Butt welds made in one pass must be backed to prevent fused metal from falling through. A copper bar, sliding copper shoe or a trough of the melt material have all been used successfully. Use of the melt material as a backing may result in a bottom bead similar to that on the top.

A rolling copper ring or sliding copper shoe has been used successfully for backing circumferential butt welds in pipe and other cylindrical products such as pressure vessels. Steel backing pieces permanently attached to, or subsequently cut from, the under part of the finished weld are sometimes used. In some instances, a weld may be made part way through the joint from one side to serve as a backing for the main weld made from the other side.

In practice, plates to be welded are arranged as for open arc on oxy-acetylene welding. The edges are beveled by flame cutting or planing, but the bevel is not cut through the full thickness nor is the vee proportion as wide as for arc welding, because penetration and width of the finished Unionmelt weld are greater. Type of melt, voltage, current and speed employed enable close control. The square portion or "nose" left during beveling is completely fused into the weld. Welds made from two sides can be made to overlap without cutting away the nose or cutting into the bottom of the first weld.

Alternating or Direct Current Used

Either alternating or direct current may be used, or direct current superimposed upon alternating current. Alternating current alone has been used most frequently because of the simplicity of obtaining it through transformers. For fillet welding, no bevel is required to obtain complete penetration and center overlap of fillets in T-butt joints in plate up to ¾-inch thick. See Fig. 3 for typical welds.

Results are influenced by magnitude and voltage of welding current, electrode size, and rate at which electrode is moved along the seam, all of which vary with plate thickness. For example, about 1500 amperes at 36 volts works well in one-pass joining of steel plates one inch thick, using bare welding wire about 5/16-inch in diameter and a welding speed along the seam of about 10 to 12 inches per minute.

With currents up to 4000 amperes or more, plates 1½ to over 3 inches thick may be welded in one pass at the rate of 3 to 7 inches per minute. Complete penetration and fusion attained in a single pass eliminate peening, wire brushing or chipping. Three-inch plates appear to be the practical limit of one-pass welding

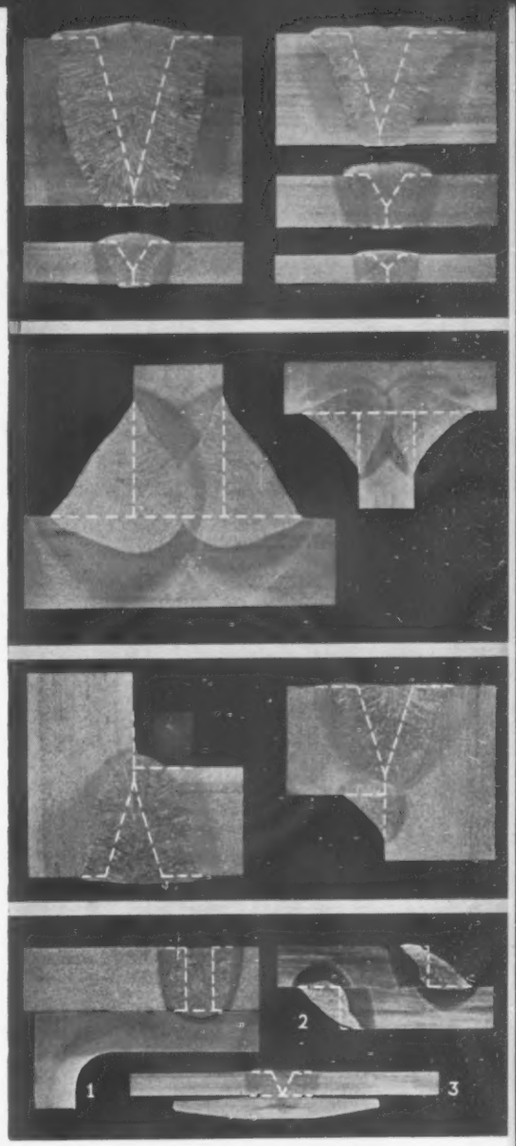


Fig. 3—Cross-section through typical Unionmelt welds showing deep penetration and excellent fillets produced. Dotted lines indicate original plate edges. Photos are unretouched

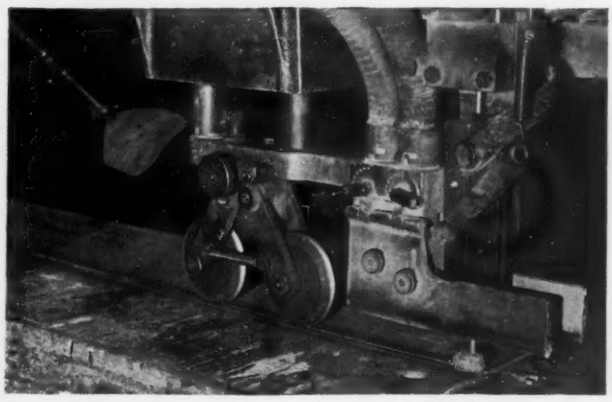


Fig. 2—How weld is started. Left, welding head is placed with guide rollers in groove and ball of steel wool under electrode end for starting the melting action. View at right shows melt powder down ready for welding to begin

Table II

Typical Production Welding Conditions for One Pass Butt Welds in Low-Carbon Steel

Plate thickness inches	* Angle of vee in degrees	* Depth of unbeveled edge inches	Welding Rod		Welding Current		Welding Speed inches per minute
			Diameter inches	Pounds consumed per foot	Amperes	Volts	
3/16	60	1/16	3/16	0.11-0.13	500- 575	33-36	29-33
1/4	60	1/16	3/16	0.14-0.23	725- 825	33-36	28-31
5/16	60	1/16	1/4	0.25-0.30	775- 900	33-36	27-29
3/8	60	1/16	1/4	0.28-0.35	900-1,000	34-37	25-27
7/16	60	1/16	1/4	0.33-0.40	1,000-1,100	34-37	23-25
1/2	60	3/16	1/4	0.38-0.45	1,075-1,175	34-37	20-23
5/8	45	3/16	1/4	0.50-0.58	1,150-1,250	35-38	16-19
3/4	45	3/16	1/4	0.60-0.75	1,200-1,300	36-39	13-14
7/8	40	1/8	5/16	0.80-0.95	1,375-1,500	38-40	11-13
1	35	1/8	5/16	0.90-1.10	1,500-1,600	39-41	10-12
1 1/8	30	1/8	5/16	1.00-1.25	1,575-1,650	39-41	9-10
1 1/4	30	1/8	5/16	1.25-1.60	1,600-1,700	39-41	8-9
1 1/2	30	1/8	3/8	1.85-2.00	1,900-2,000	39-41	7-8
2	30	1/8	1/2	3.30-3.70	2,700-2,900	40-42	5-6
2 1/2	27	1/8	1/2	4.50-5.80	2,900-3,200	40-42	4-5

* The vee does not extend entirely through the plate, an unbeveled edge or nose being kept below the vee.

with existing equipment. High cost of mechanical and electrical equipment for rapidly fusing larger amounts of filler metal calls for two passes in heavier plates. Since the weld produces little distortion and the slag lifts off easily to leave a clean surface, two passes are made easily. With most outstanding economies obtainable in production work on heavier material, the process does not attempt to compete with present spot and flash welding of light gage products.

Table I on page 49 shows approximate maximum currents required for various thicknesses of one-pass butt and fillet welds. Nominal size given for fillet welds refers to the leg dimension of usual arc welding fillets. Figures in parenthesis are approximate leg dimensions of equivalent Unionmelt welds having about equal throat strength achieved through greater penetration.

In addition to speed and high quality welds, a small amount of rod is used. The deep and wide fusion obtainable permits small vees for butt welding and small metal additions for fillet welding. The ratio of rod to plate fused in the weld is about 1 to 1.7. Rod is bare and is usually fed from coils. Since welding takes place beneath the melt, metal losses from spatter and vaporation are eliminated. Stub end loss is negligible, a 150-pound coil or rod averaging about 3 ounces loss.

The melt confines rapidly generated heat to a small space so the entire cross section of the weld is molten at one time. Consequently little heat is dissipated to adjacent zones. This combination of complete fusion and rapid weld progress minimizes distortion and reduces the total contractional stress. Since proper mechanical and electrical conditions can be established in advance, operating skill is not essential and this factor has no effect on welding speed or efficiency.

Many Applications

Large installations are now in use for fabricating ships, barges, railroad cars, locomotives, engines, pipe, tanks, pressure vessels, caissons, annealing boxes and large machinery parts. The process also has commercial posibilities in other fields including automobile parts, small machinery frames, structural shapes, pipe fittings, etc. Probably the lightest material now being welded commercially by this process is 16-gage strip for spirally welded pipe which involves long, continuous

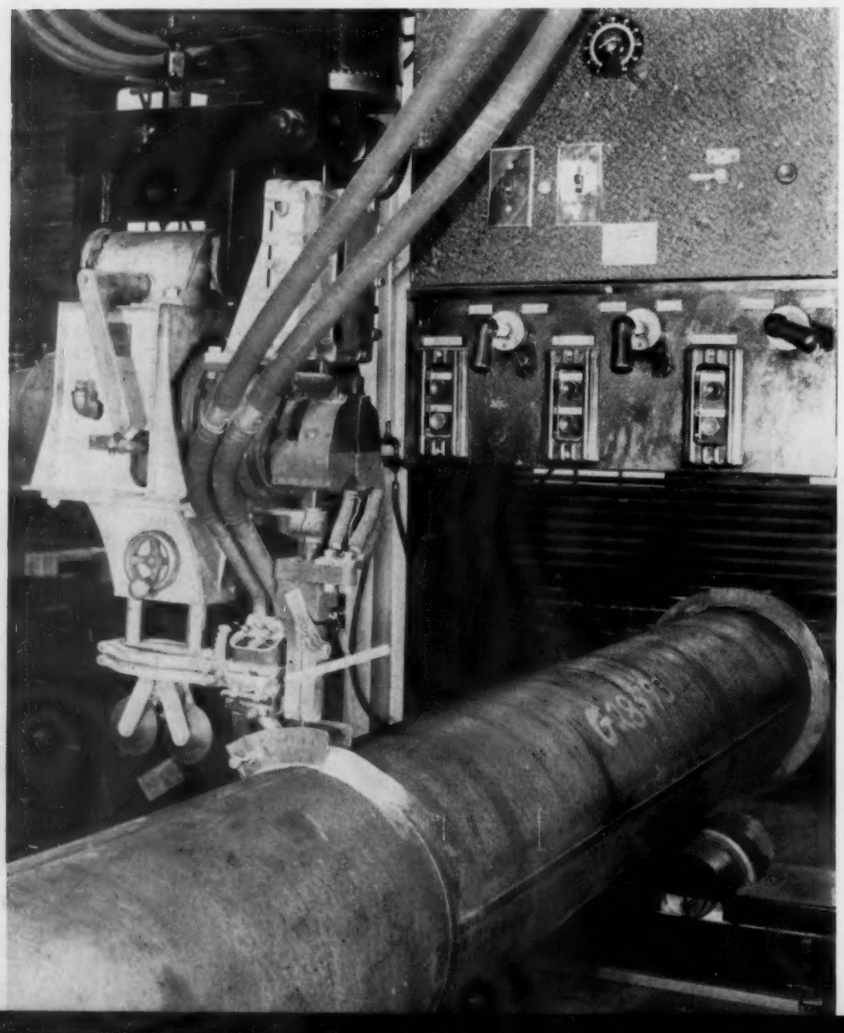


Fig. 4—Welding a Par. U-68 (Class I) presure vessel, 10 feet long and 22 inches in diameter with 5/8-inch wall thickness at rate of 19 inches per minute, using 740 amperes at 28 volts with 1/4-inch welding rod. Welding head is stationary and work is rotated. Mounted with rod reel, transformers, and melt hoppers on a bridge crane, it also moves lengthwise to make longitudinal welds

welds made at a rate of 50 inches per minute.

Unionmelt welds have met the rigid specifications of the A.S.M.E. code for fired power boilers and Par. U-68 (Class I) pressure vessels and have been approved for ship welding by the American Bureau of Shipping and Lloyd's Register of shipping.

Equipment Varies with Work

Design of any Unionmelt installation depends upon the work to be done. Equipment may range from a 15-pound, type S, portable, welding head guided by hand, to the large type M head, its 435 pounds requiring a heavy supporting structure. The small head feeds only straight lengths of welding rod, 6 to 8 feet long and up to ¼-inch in diameter, but it will handle currents up to 1000 amperes and weld ½-inch mild steel plates in one pass. The type M head feeds rod up to ½-inch in diameter from coils, handles 4000 amperes, welds 3-inch plate in one pass and greater thicknesses in two passes. Intermediate type U head weighs 125 pounds, feeds coiled rod up to 5/16-inch diameter, handles 2000 amperes and welds 1¼-inch mild steel in a single pass.

Suitable positioning and traversing equipment must be provided where automatic operation is desired. This equipment need not be complicated, however, since the welding head can be mounted either on a stationary support under which the work is moved or on an overhead crane, wall crane, portable carriage or other support which travels over the work to be welded.

Wall crane installations seem to be preferred for welding tanks, pressure vessels and similar work of relatively large size. Here it is usual practice to make light internal welds with the intermediate head mounted on the end of a cantilever which in turn is mounted on the crane bridge with accessory equipment, including rod reel and melt recovery system. The heavy head, suspended from a movable platform on the bridge, makes the external welds which are backed by and penetrated into the inside welds. The welding head is moved by the crane in making longitudinal seams while the work itself is rotated for circumferential joints. Controls, rod reel, hopper for the Unionmelt, and the recovery system are mounted on the bridge platform.

A simple gantry crane installation is suitable for welding pipe, small diameter pressure vessels, machinery parts and various structural units. In this setup, the crane may be arranged to travel over two or more jigs to expedite mounting of work, welding and removal of welded assemblies. Welding head is mounted on a vertically adjustable mast suspended from a platform at top of crane which also supports rod reel, welding composition hopper and recovery system. Transformers and controls may be mounted on crane base.

Alternating current is most frequently used. Heavy duty transformers with built-in motor controlled reactors permit remote, continuous, stepless adjustment and control of amperage during welding. Transformers in 1000-ampere units may be connected two or more in parallel. Direct current welding generators hooked up in parallel may also be used.

Proposed Standard for Welding Fittings Is Out

■ Draft of a "Proposed American Standard for Welding Fittings" has been completed by subgroup No. 6 on welding fittings of subcommittee No. 3 on steel flanges and flanged fittings of sectional committee (B16) on the standardization of pipe flanges and flanged fittings. This proposal covers the overall dimensions of fittings as designed for butt-welded joints, such as elbows and tees, caps and lapped-joint stud ends, reducers, and return bends. It covers also the pressure ratings, size, marking, material, metal thickness, tolerance, and welding bevel.

The proposal is now being distributed to industry for criticism, copies being available upon application. Communications should be addressed to C. B. LePage, assistant secretary, American Society of Mechanical Engineers, 29 West Thirty-ninth street, New York.

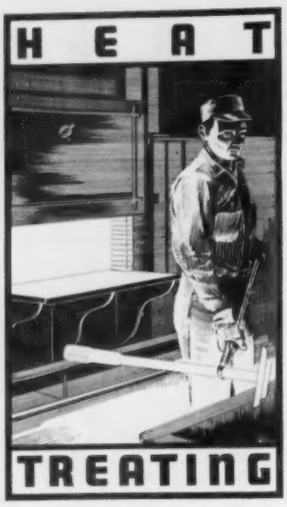
Standardization of welding fittings is a part of the project assigned to sectional committee B16. The committee was organized under procedure of the American Standards association in 1921 with the Heating, Piping and Air Conditioning Contractors National association, Manufacturers Standardization Society of the Valve and Fittings Industry, and American Society of Mechanical Engineers as joint sponsors. Thirty national organizations are co-operating in the project.

New Coating Protects Work During Fabrication

■ Known as Protex No. 102, a new type of temporary protective coating for stainless steel and other highly finished surfaces has been developed by Haydn F. White & Co., Cleveland.

One of the advantages of using this material is that it does not require a paper covering. A thin coating applied with brush or spray gun will safeguard delicate surfaces against scratches or other damage throughout fabrication, assembly or shipping, it is claimed. Removal of the coating is easily and quickly accomplished by saturating the Protex coated surface with warm water and allowing it to soak for two or three minutes.

Fig. 5—Fabricating a bending brake bed by Unionmelt welding. A 1-inch flange is fillet welded to a 2½-inch web. This illustrates how process may be applied to production of machinery frames and various structural work. All welding equipment and accessories are mounted over the work on gantry bridge moving on floor rails



Annealing Stickers

Causes and prevention of sticking are given in detail here in the second part of this article. Specific recommendations, already used successfully in many plants, are listed

Part II

Herewith is concluded an experienced engineer's analysis of a fundamental annealing problem. His suggestions are based on years of observation and actual practice

■ OF ALL the variables that contribute to sticking, that of pressure extracts the heaviest toll on operations and forces concessions that render the annealing operation nearly as inefficient as the normalizing operation.

Sheets at the bottom of any given pile are stuck tighter than the sheets at the top because the combined weight of the sheets exerts enough pressure to cause adherence of adjacent surfaces toward the bottom of the pile.

Conventional manner of control is to limit weight of the mass by limiting height of a pile of sheets, or size and number of coils in a pile. This practice prevails at all cold reduction plants and as a result the charges of cold reduced stock are restricted and on some grades the penalty is severe.

Height of piles and size of coils is carefully watched everywhere. In spite of this precaution, there appears a noticeable difference in the amount and extent of sticking at various plants for the same bulk charged.

This would indicate that for best results, a greater nicety of control must be employed than merely to limit the height of piles or size of coils.

Study of pressures involved reveals that control must extend to each sheet or coil-wrap that makes up the bulk charged if any great degree of freedom from stickers is to be obtained. As pressure operates differently in the case of sheets than in coils, any explanation of its effect is, therefore, dependent on the physical form of the stock.

A.—In Sheet or Flat Form

Under the impetus of temperature, the mechanism of the pressure is exerted by the concerted action of: The downward pressure from the weight of the sheets themselves; an equal upward pressure of reaction from below; the pressure of expansion within the sheets in resistance to the first two pressures.

Control of the amount and distribution of each of these pressures is imperative. Such control requires complete consideration of the mutual action of the forces and their cumulative effect at their particular planes of action.

Size Varies Pressure

Plane of action of the downward pressure will vary with the bulk or mass, as a whole, which in turn depends on the physical dimensions (thickness, width and length) of the individual sheets. Thus height of piles must be regulated in keeping with the size and thickness of the sheets to avoid building up a dead weight which would exert enough pressure to cause adhesion.

Plane of action of the upward pressure is really the plane of action of the downward and upward pressures and depends on the same factors as the downward pressure. For practical purposes, this plane of reaction is near junction of pile and base on which it is mounted.

Here, too, control must be exercised in that this junction is a focal point, not only of upward and downward pressures alone but also marks a pronounced discontinuity in the nature of the materials in contact. At the prevailing temperatures, the sheets are plastic and the pile settles and "sets" to conform to the rigidity and contour of its base. If the junction is not flat or level, or badly shaped and of insufficient area, localized high-pressure areas are readily developed by the uneven set of the plate which serves as a bearing for the entire load. Effect of this high pressure is propagated into the pile, producing adherence in the local areas affected.

The plane of action of pressure is along the adjacent sides of the sheets in contact with each other. Thus each sheet can be a potential source of sticking, as all are in contact with each other. However, the essential or crucial pressure must be present. As expansion pressure is produced by combined resistance of downward and upward pressures to the natural expansion of the sheets, it is apparent that this pressure increases progressively downward in the pile and that the cubical contents of the sheets (thickness, width and length), likewise, influence this pressure as expansion reflects a change in volume. If contact between the surfaces of the sheets is localized or "spotted" by untoward conditions, premature development of crucial pressures is enhanced inasmuch as such points of contact will also act as "bearings" as the sheets settle and sag into contact.

Proper Piling Essential

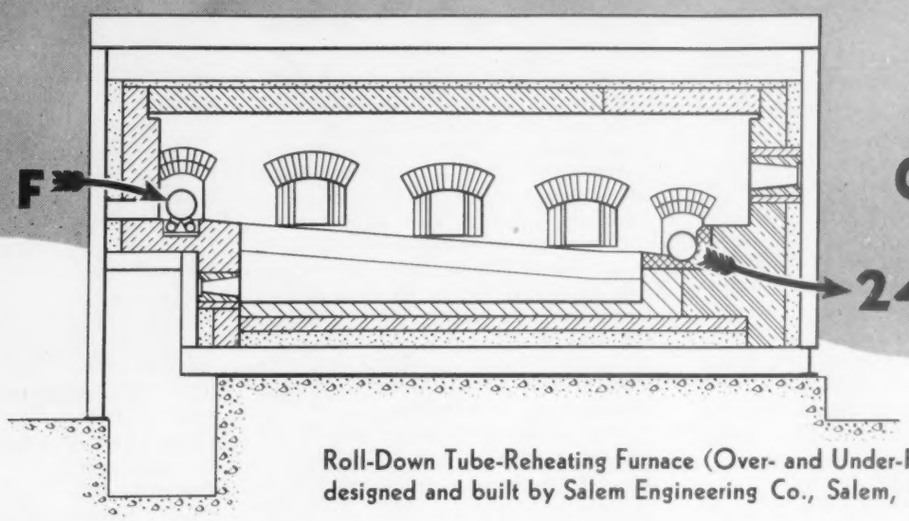
Thus careful control must be exercised that the sheets are in good shape and condition and that proper loading and piling is done.

Burden of control, therefore, extends to tandem mills, slitting and cutting lines, and the annealing floor.

However, the practical methods of control at all plants are necessarily focused on the loading and piling at the anneal as the most logical point to exercise any decisive meas-

50 Tons per hour

IN *at* 2000 F



OUT *at* 2400 F

Roll-Down Tube-Reheating Furnace (Over- and Under-Fired) designed and built by Salem Engineering Co., Salem, Ohio

B&W REFRACTORIES

Flat suspended roof—B&W K-30 and K-30-3 Insulating Firebrick backed with B&W K-20

End and side walls—B&W K-30 backed with B&W K-20

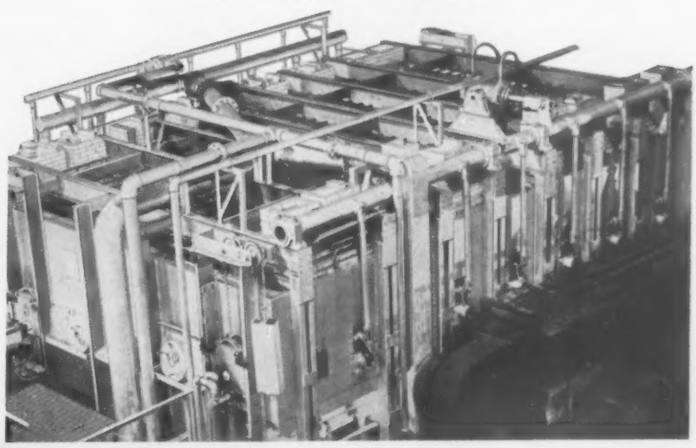
Piers—B&W Junior Firebrick

Bottom—B&W Junior Firebrick insulated with B&W K-26 and B&W K-20

End of hearth opposite discharge door—B&W Plastic Chrome Ore

- RAPID heating rate (4 Hours)
- NO SPALLING OR CRACKING, during short on-and-off cycle
- LOW COST — installation and maintenance

Exterior of the Roll-Down Tube-Reheating Furnace, installed at The Babcock & Wilcox Tube Company, Beaver Falls, Pa.



THE BABCOCK & WILCOX COMPANY
Refractories Division
19 Rector St., New York, N. Y.

BABCOCK & WILCOX

ure of regulation. These usually take the form of definite instructions along the following lines:

Use only flat and clean bases. Warped, cracked, uneven, dirty or wavy bases are a poor foundation for a pile.

Pile evenly and uniformly. Space piles properly so they do not come in contact with each other.

Gage and size of sheets must be considered in piling. Don't mix light and heavy gages in big piles. Height of piles regulated in keeping with size and gage—wide sizes piled lower and light gages restricted to lower piling.

Badly buckled, wavy, corrugated and out-of-flat sheets are placed on top of flat stock or segregated in lower piles.

Gage variation or excessive crown in sheets requires lower piling or segregation.

Handling dents and such surface defects requires stock to be restricted to tops of piles or small piles.

Sheets must be free of dirt, metal particles, slugs, tags, and foreign matter of all kinds if the height of piles is to be near normal.

Burred edges on sheets must be closely watched and piling regulated accordingly. In extreme cases of burr, resort to cold rolling if necessary to remove this defect before piling.

Care must be taken to insert thermocouples properly in the piles.

B.—In Coiled Form

In the case of coils, while the pressure to be contended with is the direct result of the mutual action of the same downward, upward and expansion pressures, the physical form and nature of the coils alter the amount and distribution of these forces.

Bulk or overall size of the individual coil weighs less than a similar bulk occupied by a pile of sheets so total amount of pressure is correspondingly smaller. This explains why higher annealing temperatures are used on coils than on sheets.

Relative amount of each pressure is different in that the planes of action of these forces in coils differ from those in sheets. With sheets, the forces are vertical acting only in horizontal planes. With coils the planes of action are both horizontal and vertical, as follows:

The plane of action of downward and upward pressures is at the bottom of the coils where they rest on edge. This means that the coil-wraps must be even, uniform and snug against each other, not protruding or loose, so that under temperature the weight does not cause the coil to collapse or the edges to fold up or lap over one another with consequent localization of pressure.

Plane of action of expansion pressure is in a vertical plane around each wrap of the coil and is asserted at points of contact between coil wraps. Factors involved in this change of volume include: How tightly the coil is wrapped and how securely it is strapped or wired on the outside. On these factors depends the amount of force generated in resistance to the natural expansion. Also they tend to localize this force.

The first requires careful control of tension in coiling from the tandem mills or in rewinding at slitting or cleaning lines. Also physical shape of wraps must be even, flat and uniform so no local high pressures are promoted between the coil wraps. The other requires that wiring or bundling of coils for annealing be watched so wiring is not too tight to prevent even and uniform expansion.

Net effect of these pressures seems to vary mostly in keeping with the thinness and width of the stock. Cold reduced tin mill products and especially wide sizes are susceptible to collapsing and mashed edges. With thin or wide stock, more area is exposed to expansion pressure. Regardless of the fact that total pressure is not so high in coil form, it is apparent that the sticking hazard will be great unless proper regulation and control are maintained. Each individual coil in a charge must be wrapped and packaged properly and because of the bulkiness and shape of the product, close supervision of loading and piling must also be exercised.

Regulating Coil Pressure

Control of pressure in coil annealing usually is covered by regulations such as:

Watch tension used in winding coils. Tension tables based on width and gage should be available to tandem mills, slitting lines, cleaning lines, recoilers or rewinders. Tension should not be too slack or tight.

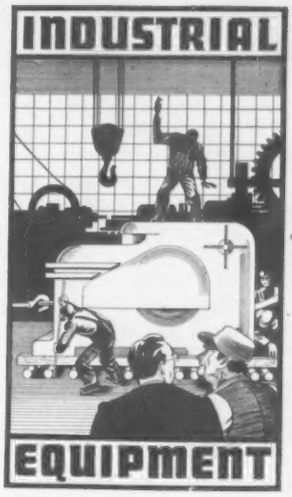
Good shaping and wrapping is essential. Edges must be even and flush. Telescoped and protruding edges on coils should be corrected by rewinding, if necessary. Ridges or riffled wrapping is unsatisfactory. If two or more coils are welded or joined together to make one big coil, be sure junction is even and in line so coils are properly lined up.

Shape of strip off the tandem mill is important. A twist or heavy center buckle is a source of sticking, while a double buckle toward edges or sides (fishtail) seems to prevent

(*Please turn to Page* 58)

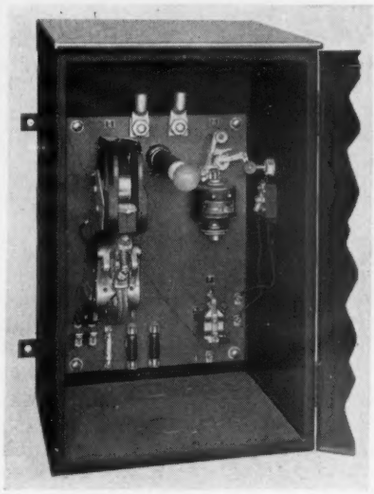
Casts Huge Gear Blanks of Steel

■ **This shows one of six 18-ton cast steel gear blanks, the largest and heaviest ever turned out by National-Erie Corp., Erie, Pa. Each of these will measure 145.5 inches outside diameter when finished. Face is 30 inches, bore is 27 inches. Gears will be used in drum and idler shaft drives on large hoists in the copper mines of a southwestern mining company**



Sectionalizer Protects Direct Current Circuits

■ Electric Controller & Mfg. Co., 2700 East Seventy-ninth street, Cleveland, has devised a new line-arc repeating sectionalizer for the protection of direct current power circuits such as sections in coal and ore mines, crane feeders and similar industrial applications.



Instrument consists of a magnetic contactor, an overload relay equipped with a ratchet lockout feature, and a timing circuit to provide time delay. An overload or short circuit causes the overload relay to trip and open the contactor. After a definite time interval (2 seconds), the contactor recloses, establishing power to the circuit it feeds. If condition of overload still exists, contactor will open again and then automatically reclose after another interval. This cycle of operation will repeat until the number of relay trips determined by setting of the ratchet lockout has been reached.

Sectionalizer is built in various sizes to meet requirements of different capacities of power circuits.

Tubular Wrench Handle Provides Extra Leverage

■ Bonney Forge & Tool Works, Allentown, Pa., has introduced a new line of heavy duty box wrenches with interchangeable tubular handles.

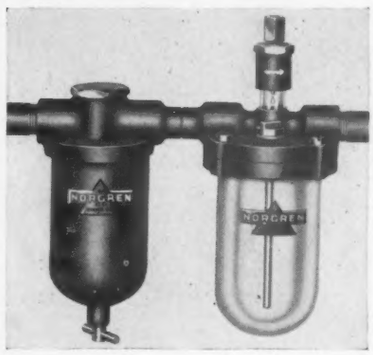
These wrenches are drop-forged chromium steel, heat-treated and heavily plated, with polished heads. They are furnished in both double-offset and 15-degree angle type, and each type is made in seven sizes with double hexagon openings ranging from 1⅝ to 2¼ inches. One size of interchangeable tubular handle is all that is necessary for use with the full set of 14 wrenches. This 30-inch handle provides extra leverage for turning large nuts.

These tools are designed for breaking loose or tightening large diameter nuts with a minimum of effort and are recommended for work on trucks, tractors, road and industrial machinery.

Device Conditions Air For Air-Operated Tools

■ C. A. Norgren Co., 222 Santa Fe drive, Denver, has introduced a combination device for conditioning air to be used in the operation of air tools. This unit consists of an air strainer and a sight-feed, automatic air line lubricator.

Strainer has a double screen, a bronze head and a drawn steel, tin-dipped bowl. A 200-mesh monel screen is supported by a 100-mesh brass screen. This strainer removes dirt, scale and other impurities from the air stream, and traps approximately 92 per cent of the moisture. There is said to be no restriction of



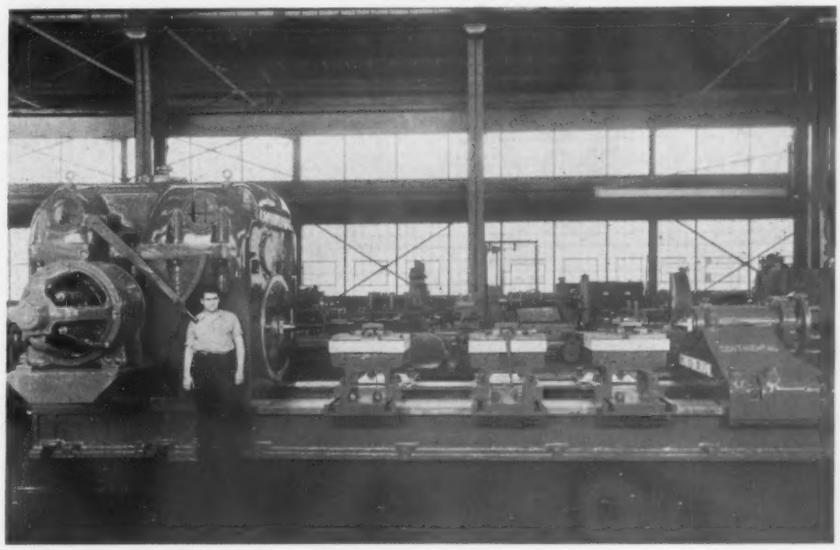
air flow and no noticeable pressure drop. Sizes are ¼ and ⅜-inch.

The lubricator has a transparent oil reservoir of resilient plastic, suitable for installations in temperatures up to 180 degrees Fahr. Oil feed is controlled by a simply adjusted needle valve which reveals the exact amount of lubricant being introduced to the air stream. Adjustment is tamperproof. Lubricator is available in ¼, ⅜ and ½-inch sizes for horizontal lines.

Redesigns Roll Lathe to Meet Modern Standards

■ Continental Roll and Steel Foundry Co., 38 South Dearborn street, Chicago, has developed an improved lathe for turning mill rolls. Radical changes in design and operation were necessary in order to produce a machine which would handle the larger and more accurate rolls needed in high production mills.

This lathe has no overhung gears, no internal gears and pinions, no straight spur gears and consequently no tendency to chatter. Face



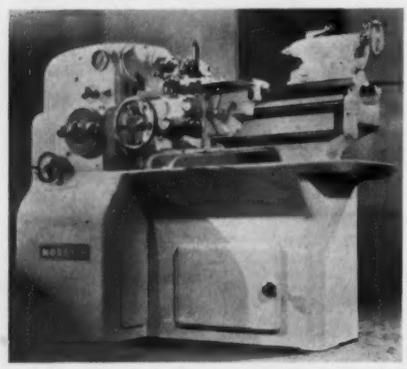
Because of redesigned drive mechanism, this roll lathe's motor transmits full power to the headstock, according to the manufacturer

plate is concealed, with only the dog lugs extending beyond face of the headstock. Overhung pinion is replaced by a double helical pinion with roller bearing journals on each side. Customary internal gear has been converted into a double helical gear mounted on roller bearings.

Pressure lubrication is applied to all moving parts to insure good operating conditions at all times. Headstock has inspection windows, which permit operator to view any part of mechanism within headstock. Tailstock has been redesigned and provisions incorporated to facilitate centering of the roll and moving tailstock laterally to accommodate various lengths of rolls.

Apply Functional Design To New Precision Lathe

■ Monarch Machine Tool Co., Sidney, O., has introduced a streamlined 10 x 20-inch sensitive precision lathe, designed so that all protruding parts are either removed or replaced with



more modern methods of accomplishing their purpose.

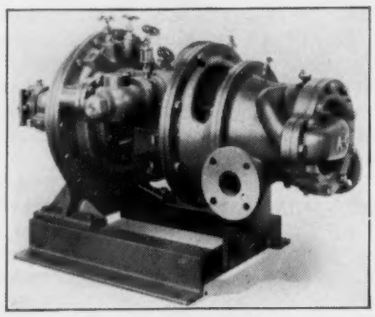
This machine features a 100-to-1 infinitely variable spindle speed range; feeds automatically supplied through an endless web belt; threads chased through the regular end gearing to the quick change gearbox; and drives from spindle to gearbox automatically selected. The lathe bed, headstock, tailstock, carriage, apron, gearbox and taper attachment are all Meehanite castings.

A 1½ or 2-horsepower motor provides spindle speeds from 25 to 2500 revolutions per minute. Feeding rate varies from 0.001 to 0.0075-inch and feeds from 0.002 to 0.060-inch may be had through the quick change gearbox. Fifty changes of threads and feeds are possible.

Leadscrew and feed rod are mounted on anti-friction bearings, leadscrew having a diameter of 1 inch, 8-pitch. In each 12 inches of length, it is said lead error cannot exceed 0.0005-inch. Taper attachment turns 15-degree included angle, 6-inch length at one setting. This attachment is provided with a micrometer setting.

Compact Turbine Pumps Utilize Process Steam

■ Allis-Chalmers Mfg. Co., Norwood works, Cincinnati, has placed on the market a line of SS type close-



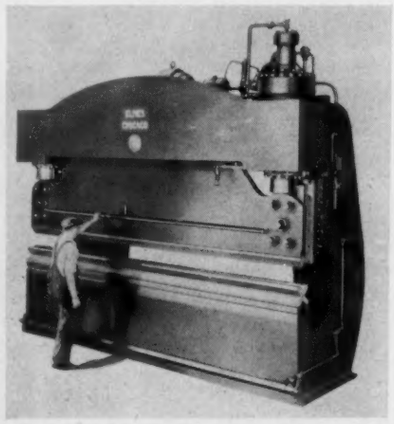
coupled steam turbine centrifugal pumps for application in small power plants or with auxiliary pump units in large steam plants.

These pumps are particularly suitable for use in industrial plants where process steam is available. In some instances compressed air can be used for driving the turbine. Single and two-stage pumps in this line are available for capacities up to 500 gallons per minute for heads up to 500 feet.

Hydraulic Bending Brake Features Deeper Throat

■ Charles F. Elmes Engineering Works, Morgan & Lake streets, Chicago, has introduced a bending brake with greater depth of throat and opening than is usual in this type of machine. Its construction consists of welded steel housings, bed and beam, in which are mounted standard hydraulic units.

Bending beam is accurately guided on the steel housings, and adjustable guides are used. Beam travels to



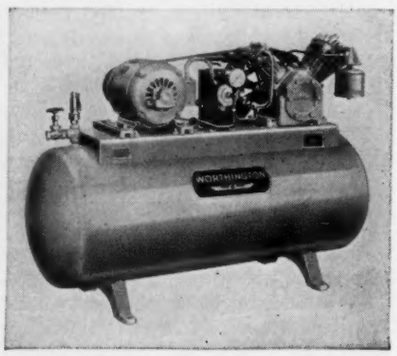
the work at a rapid advance speed, automatically slowing down for actual bending or forming operations. Movement of the beam can be stopped and held at any predetermined point by the operator. Travel of the two pistons which force the bending beam downward is so equalized that it remains constant, regardless of eccentric loading. Downward advance speed and working speed are adjustable from zero to maximum.

No special dies are required for this brake, since it will accommodate standard dies.

Air Compressors Have Balanced Angle Design

■ Worthington Pump & Machinery Corp., Harrison, N. J., has introduced a new group of balanced-angle, V-type industrial air and gas compressors, known as VA and VA-2.

Available in a variety of arrangements, these machines are suitable for any service requiring a self-contained air or gas compressing unit.



Electric motor driven, tank or base-mounted units with automatic start-and-stop control or constant speed unloaders are included in this line. Gasoline engine driven units equipped with either constant speed control or automatic stop may be had in either type of mounting.

Adds Magnetic Switch For Single-Phase Motors

■ General Electric Co., Schenectady, N. Y., has placed on the market a magnetic switch for application in the starting of single-phase motors. Available in ratings of 3-horsepower at 110 volts, 5-horsepower at 220 volts and 7½-horsepower at 440 volts, this device consists of a standard general purpose 4-pole magnetic switch with two poles connected in parallel. This arrangement is said to make switch equivalent to a 2-pole switch with one overload relay. Its application is limited to use with single-phase motors whose normal full-load current does not exceed 30 amperes.

Gasoline Pumps

(*Concluded from Page* 46)

in diagram all lines converge at the far end.

Sequence of assembly operations is as follows: The pump is built up from heavy cast iron base by first attaching the corner posts to the base. This is followed by attaching the top section to the corner posts. This section also is usually of cast iron although the wide variety of types produced in this plant includes some with formed steel top sections, or spiders. Outer covers or caps are always of sheet steel.

The gasoline pump is next fastened in place, followed by attaching the metal support shelf and the meter. These units now are connected by piping and the clock or computer support attached.

After clock indicator or computer mechanism has been attached, the electric wiring, switches and other electrical equipment are mounted in place. Electric wiring is in conduit. As many designs are extremely compact, the bending and forming of conduit and its installation is somewhat of a problem and so must be carefully worked out in the sequence of assembly operations so all items go together without interference.

With the addition of the flow indicator, the gasoline pump mechanism is complete. Now panels at two sides of the pump are mounted permanently in place. Front and back panels are hingled to provide access to mechanism. Power driven screwdrivers and nut turners are used in assembling the parts, and every possible device for efficient operation is included in equipment available to assembly operators.

Lines Converge at Spray Booth

At the far end of the assembly line the four assembly lines converge to one line going through a spray booth. Here all interiors receive a lacquer spray. This contains aluminum pigment to afford effective protection to the metal parts against rust and corrosion.

The pumps now proceed crosswise the building on a number of lines as shown in the layout diagram. All conveyors are the roller type set at floor level, permitting the workmen to easily move the pumps to any location desired. A number of turntables in the conveyor lines afford a wide degree of flexibility and permit considerable storage on the lines without interfering with flow of material in production.

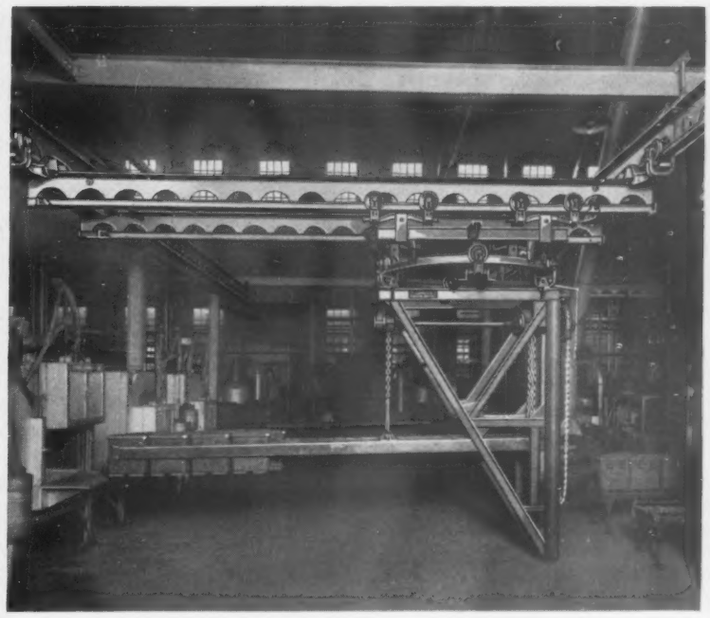
Finishing operations on the outside surfaces include a primer coat and a color coat using synthetic enamel. Each coat is dried in ovens at a temperature of about 180 degrees Fahr. All inside parts are masked off during spraying to prevent paint from entering.

After exteriors have been painted, various small parts are fastened on the pump including hinges, meter cases and other parts. A large number of these are die cast. For instance, all meter cases, hinges, nameplates, computer and clock parts, window frames, etc. are die cast. These are nickel or chromium plated as desired.

A rather unusual machine seen in the shipping department at this plant is an automatic nailer which makes crates in which the pumps are shipped. In this machine the wooden strips making up a side, bottom or top panel of the crate, are laid between guides in the position desired and then the machine closed. Upon tripping the mechanism, nails are automatically driven through all the overlapping points, nailing a complete frame almost instantly. As the machine can be arranged to take a wide variety of sizes, it is a most valuable addition to the shipping department, since it places the making of crates truly on a high production basis.

CLEVELAND TRAMRAIL

OVER HEAD HANDLING EQUIPMENT



● For heat treating furnace charging, Cleveland Tramrail has developed several types of equipment. This one is rotating. Cold Heat Treatment Pots are picked up from the roller conveyor; the charging unit rotated 180 degrees; the complete unit is then lined up with the proper furnace door and locked into position. Hot charges are returned to another conveyor line by reverse motion.

ALSO BUILDERS OF CLEVELAND CRANES ALL WELDED

CLEVELAND TRAMRAIL

DIVISION OF

THE CLEVELAND CRANE & ENGINEERING CO.

1125 Depot St.

WICKLIFFE, OHIO.

Or Consult Your Phone Directory under Cleveland Tramrail

Annealing Stickers

(*Concluded from Page* 54)

sticking. Excessive crown is harmful unless allowance is made in coiling tension so that expansion pressure is not localized.

Careful handling of coils to prevent damage is required at all times. Dents and mashed edges from tractor rams conveyors, crane slings, magnets, etc., are particularly objectionable.

Burred edges and adhering slugs, metal particles, sand and foreign matter between coil wraps are harmful.

Allow for expansion by proper bundling of coils. Strapping coils around "belly" should be avoided if possible. Insert cardboard or corrugated paper liner under wiring. Do not mash edges when wiring across the width of coil, insert metal protectors.

Use only flat, even and smooth annealing bases.

Pile coils on end, never on sides. If weight and size of coils permit double or triple piling, insert a flat metal platform between coils.

Space coils properly so they do not touch each other.

Use coil spiders or reinforcers if collapsing appears likely.

Be careful in inserting thermocouples in coils.

Surface Condition a Factor

Sticking characteristics of any product naturally depend on its surface condition. The smoother the surfaces, the closer or more intimate the contact between adjacent sheets or coil-wraps and the more readily the effects of temperature, time and pressure can assert themselves to cause physical adhesion or even molecular cohesion of one surface to the other.

For many years continuous mills labored under this handicap as their product came from the tandem mills with a bright, highly polished surface, necessitating coil annealing where sticking was not so great a hazard but which product was of inferior drawing quality to the competitive hand-mill sheet.

Control of the degree of intimacy of contact between adjacent surfaces appears from many angles to be the most decisive of the four factors causing stickers. At least, control in this respect has produced greater positive results than has been achieved by manipulation of the other factors.

First attempts at control along this line called for the application of such substances as plumbago, graphite, talc, soapstone or various patented materials in one form or another to the surfaces of the stock. While such material affected the intimacy of contact and usually prevented or minimized sticking, particles of these substances adhered or were baked on to the surface and rendered the product unsatisfactory for further processing or use, even after an additional cleaning operation.

Later attempts to accomplish this end were concentrated on "dulling" the surface as per the Shonkwiler process and solutions. Another method employed to secure a dull surface finish involved acid-etched rolls. Cost and other reasons mitigated against these practices.

Roughened Rolls Help

Finally sand blasted cold rolls provided control over the surface characteristics of the product so in many cases annealing in sheet form was practical. Such roughened surfaces, consisting of a hill-and-valley effect, do not give the intimacy of contact afforded by smooth finishes; they impede the adherence of adjacent surfaces and therefore permit greater masses or bulks to be annealed.

However, there is a limit to the degree of roughness, or dull, that operators can impart to the surface of their product and consequently annealing operations on most products must be executed carefully to avoid stickers.

Ultimate use and other practical considerations of the product determine to what extent, if any, control may be exercised by dulling the finish prior to annealing.

Certain grades are specified "bright finish," and in such cases no control by dulling is permissible, and such products are usually annealed in coil form to avoid stickers. Some plants, however, have obtained a measure of relief by carefully revising the grit used in polishing and grinding the work rolls used on these grades. This is true at some cold-reduced tin mills where the stock is annealed either in coil form or in the flat.

The bulk of the cold-reduced products permits dulling the surface before annealing, and so considerable relief from stickers is found where it can be practiced. At some cold-reduced tin mills, the product goes to the anneal with an exceptionally rough or "oatmeal" surface. Sheet mill practice varies from heavy dull to a light dull with proportionate amount of sticking. Most mills use as heavy a blast on the rolls as they find practical and consistent with the use of further processing of the product.

To secure the maximum benefits of this method of control to the fullest extent requires:

Intelligent and careful inspection by contact men to guide the mill in developing the proper degree of dull for the orders, also necessary equipment and setup for sand-blasting or shot-blasting and proper regulation of tonnages worked on blasted rolls.

Most operators, where circumstances permit, have revised and standardized the finish of their product going to the anneal and yet must still contend with stickers in a considerable portion of their tonnage.

This has led some mills to further experimenting in controlling the degree of contact or intimacy of adjacent surfaces. The trend has been to revert to experimental work with solutions or substances applied to the surfaces. Preliminary results seem to be encouraging at several cold-reduced tin plants. The most promising results seem to have been obtained by applying a thin film of light oil in which is dissolved a chemical. Practical tests of this treatment reveal that sticking tendency can definitely be minimized on bright or smooth finish and no solid particles adhere to the stock. High hopes are held that a light deposit of soot or carbon, which reacts on mender sheet percentages, can be eliminated from sides and edges of the piles.

♦

British Mechanical Year Book in New Edition

■ *Mechanical World Year Book*, 1939; fabrikoid, 360 pages, 4 x 6 inches; published by Emmott & Co. Ltd., Manchester, Eng.; supplied by STEEL, Cleveland; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London S. W. 1.

In its fifty-second year of publication, this yearbook has been revised to date in all departments, and the section on ferrous and nonferrous alloys is presented with much fuller data on properties and preparatory treatment.

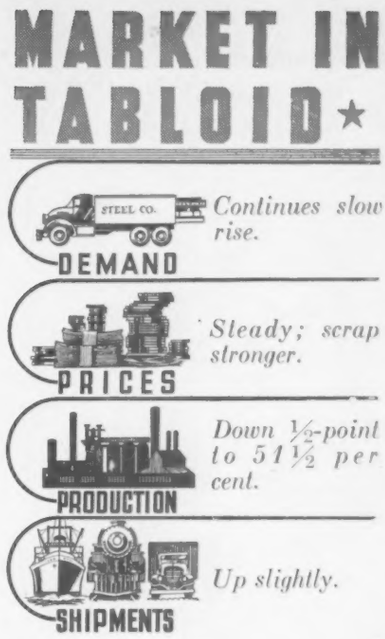
Usual full tabular and text present information in various mechanical fields, with standards and formulas for use in a wide variety of engineering computations.

Test Strength of Steel Rigid-Frame Near Knee

■ Distribution of stress in and near the knee of a riveted steel rigid-frame specimen having straight flanges recently was investigated both experimentally and theoretically by the bureau of standards, Washington, to determine maximum load which could be sustained under various conditions. Theory developed agreed with experimental conclusions. Reinforcing outer corner was found to have little effect on stress distribution in the frame. Copies of research paper RP1130, describing these experiments, may be obtained from the bureau.

Early Requirements Govern Steel Sales

Demand, Output Hold; Gain In Railroad Orders Likely



■ MODERATE recovery in miscellaneous steel demand, a gain in automobile production and quickening in railroad markets are outstanding favorable developments in the industry.

These factors point to rising production later in the quarter, despite the recent tendency for steelmaking to level off. Operations were down half a point last week at 51.5 per cent.

The seasonal pattern of steel production formerly called for a steady upturn in output during January and February. Since 1936 this trend has been altered by the introduction of new automobile models in November instead of January, thereby moving into fourth quarter a substantial tonnage which in the past was produced in January and February.

In both 1936 and 1937, two of the steel industry's best years, steelmaking moved within a narrow range until February.

Buyers continue hesitant to order beyond early needs, although with only a few exceptions stocks are low and requirements are steady or heavier. Indicative of recovery in steel consumption by smaller users, warehouse sales generally are back to early-December levels and in some instances business is well ahead of last month.

Building Steel Contracts 50 Per Cent Ahead of 1938

Bookings of fabricated structural shapes and concrete reinforcing bars last week were sharply higher than a year ago and more than 50 per cent ahead of the 1938 weekly average. Since a large share of this business is for the public works program, a decrease in awards and inquiries is in prospect. However, sizable backlogs have been accumulated and a substantial tonnage still is pending. This will assure heavy shipments for several months.

Automobile assemblies showed an unexpected increase last week. The gain of about 3000 units to 90,205 cars and trucks was the third consecutive upturn this month. Normally a decrease is indicated for this period, but favorable reports continue from automotive sales departments.

Automotive steel orders have been small lately, principally for fill-in needs. Sustained consumption improves the outlook for early absorption of stocks carried over from last quarter and renewed buying of larger lots.

Railroad programs for equipment and material buying gradually are taking form. While these involve fairly heavy steel tonnages and tend to confirm expectations of a marked increase in purchases over the poor volume of 1938, a number of roads are slow to proceed with contemplated replacement of tracks, freight cars and locomotives.

Several Roads In Market For Rails And Equipment

Missouri Pacific is expected to buy 40,000 tons of rails and 1000 freight cars. Union Pacific, allocating 100,000 tons of rails and accessories, is in the market for 1000 to 2000 cars. Rock Island may order 45,000 tons of rails. Seaboard Air Line has placed 8000 tons of rails and the Seattle, Portland & Spokane 4000 tons. Pennsylvania railroad will recondition 100 coaches.

Steelmaking trends in different districts were mixed last week. Pittsburgh was down 2 points to 42 per cent, Chicago eased 1 point to 48 per cent, while Youngstown slipped 3 points to 52 per cent. Reflecting automotive activity Detroit advanced 1 point to 88, and Cleveland was up 2.5 points to 59.

Cincinnati dropped 10 points to 55 per cent, and New England was off 5 points to 70. Birmingham continued among the most active centers at 77 per cent, with remaining districts also unchanged. These include Wheeling at 64 per cent, eastern Pennsylvania at 34, Buffalo at 44 and St. Louis at 40.

Favorable implication of continued strength in most scrap markets has been supplemented by the purchase of 25,000 to 30,000 tons by a leading steelmaker. Scrap prices are steady or higher, with the composite unchanged at $14.79. The finished steel composite holds at $56.50.

COMPOSITE MARKET AVERAGES

	Jan. 21	Jan. 14	Jan. 7	One Month Ago Dec., 1938	Three Months Ago Oct., 1938	One Year Ago Jan., 1938	Five Years Ago Jan., 1934
Iron and Steel	$36.37	$36.37	$36.36	$36.36	$36.48	$38.95	$31.15
Finished Steel	56.50	56.50	56.50	56.50	57.04	61.70	51.10
Steelworks Scrap..	14.79	14.79	14.79	14.77	14.00	13.85	11.24

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Jan. 21, 1939	Dec. 1938	Oct. 1938	Jan. 1938
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.75
Iron bars, Terre Haute, Ind.	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.465
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.445
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.15	2.10	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.15	3.55
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.15	2.10	2.50
Sheets, cold-rolled, Gary	3.20	3.20	3.15	3.25
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.35	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, open-hearth, Youngs.	$34.00	$34.00	$34.00	$37.00
Sheet bars, open-hearth, Pitts.	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	Jan. 21, 1939	Dec. 1938	Oct. 1938	Jan. 1938
Bessemer, del. Pittsburgh	$22.34	$22.34	$22.34	$25.26
Basic, Valley	20.50	20.50	20.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	22.34	25.34
No. 2 foundry, Pittsburgh	22.21	22.21	22.21	25.21
No. 2 foundry, Chicago	21.00	21.00	21.00	24.00
Southern No. 2, Birmingham	17.38	17.38	17.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	20.89	23.89
No. 2X, del. Phila. (differ. av.)	23.215	23.215	23.215	26.215
Malleable, Valley	21.00	21.00	21.00	24.00
Malleable, Chicago	21.00	21.00	21.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.24
Gray forge, del. Pittsburgh	21.17	21.17	21.17	24.17
Ferromanganese, del. Pittsburgh	85.27	97.77	97.77	107.49

Scrap

Heavy melting steel, Pittsburgh	$15.75	$15.50	$14.95	$14.05
Heavy melt. steel, No. 2, E. Pa.	13.25	13.20	12.95	13.75
Heavy melting steel, Chicago	13.75	13.85	13.05	13.25
Rails for rolling, Chicago	17.75	17.75	16.25	14.90
Railroad steel specialties, Chicago	16.00	16.05	15.55	15.75

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.75	$4.25
Connellsville, foundry, ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New York, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c
Pacific coast points	2.70c

Iron

Terre Haute, Ind.	2.15c
Chicago	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.05c
Chicago, Gary, Buffalo Cleve., Birm., Young., Sparrows Pt.	2.05c
Detroit, delivered	2.15c
Gulf ports	2.40c
Pacific coast ports, f.o.b. car docks	2.50c
Philadelphia, del.	2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45

(Per pound)

Polished staples	3.15c
Galv. fence staples	3.40c
Barbed wire, galv.	3.20c
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

*Delivered.

Alloy Bars (Hot)

(*Base, 3 to 25 tons*)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.80c
Detroit, delivered	2.90c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 1504600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10

5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15

9200 spring rounds, squares 0.40

Electric furnace up 50 cents.

Piling

Pittsburgh	2.40c
Chicago, Buffalo	2.40c
Gulf ports	2.75c

Strip and Hoops

(*Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons*)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm.	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c

Carbon	Cleve. Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(*Gross Tons*)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham.	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	65-5-5 off
Do. larger, to 1-in.	60-10-5 off
Do. 1⅛ and larger	60-5-5 off
Tire bolts	50-5 off

Stove Bolts

In packages with nuts attached 75 off; in packages with nuts separate 75-12½ off; bulk 85 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5-5 off
Elevator bolts	50-10-5-5 off
Plow bolts	65-5-5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	65-5	70
⅞-1-inch	60-10	65
1⅛ and larger	60-5	60-5

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	65-10 off

Square Head Set Screws

Upset, 1-in., smaller	73-10 off
Headless set screws	62-10 off

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¾ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B

Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(*Gross Tons*)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl.	43.00
Do., over ⅝ to 41/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.75	23.25	22.25	23.75
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.87	.....	.....	.....
Boston from Everett, Mass.	23.25	23.75	22.75	24.25
Boston from Buffalo	23.25	23.75	22.75	24.24
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birminghom	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del Chicago	28.34
		Lyles, Tenn.	23.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	56.05
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickest magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $80.00
Do., del. Pittsburgh 85.27

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman, 2½ carbon 86.00
2% carbon, 93.00; 1%, 103.00
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.65-1.70

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. tl., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots. 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.05
Do, smaller lots 2.15

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c
Do, 2% 12.50c
Spot ¼c higher

Silicon Briquetes, contract, carloads freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.50c
Ton lots 5.00c
Less-ton lots 5.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50
Do, spot 102.50
34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.76
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.50
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.50
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	4.55	3.85	3.85	5.20	3.90	4.80	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
Detroit	3.43	3.58	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.87	4.02	4.02	3.82	3.82	5.42	3.77	4.72	4.77
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.00	4.15	4.15	3.95	3.95	5.71	3.90	....	5.25
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	....	5.54
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25
Seattle	4.30	4.50	5.85	4.05	4.15	5.90	3.95	....	5.25
Portland, Oreg.	4.30	4.70	6.10	4.15	4.15	5.90	3.75	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.05
San Francisco	4.05	4.45	6.00	4.00	4.00	5.60	4.00	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	SAE Cold Drawn Bars 3100
Boston	3.61	4.43	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.39	4.14	7.50	6.10	5.85	7.90	8.69	7.29
Philadelphia	3.66	4.36	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.35	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.57	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.95	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	4.05	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	3.60	3.58	7.57	6.17	5.92	7.30	8.55	7.15
Cincinnati	3.60	4.30	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.64	4.00	7.60	6.20	8.79	9.34	8.94	7.54
Milwaukee	....	4.18	3.93	7.48	6.08	5.85	7.88	8.48	7.08
St. Louis	3.76	4.32	4.07	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.09	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.73	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.00	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Jan. 19

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$23.40 5 0 0	$17.47	2 1 0
Basic bessemer	....	15.98	1 17 6
Hematite, Phos. .03-.05	26.91 5 15 0*	.....	.....
Billets	$34.52 7 7 6	$42.60	5 0 0
Wire rods, No. 5 gage	53.24 11 7 6	43.66	5 2 6
Standard rails	$44.46 9 10 0	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	1.95c to 2.05c	5 0 0 to 5 5 0
Structural shapes	2.09c 10 0 0	1.90c	4 17 6
Plates, †¼ in. or 5 mm.	2.29c 10 18 9	2.19c to 2.39c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm	2.72c 13 0 0	2.83c	7 5 0°
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.41c	8 15 0
Bands and strips	2.77c 13 5 0	2.05c	5 5 0
Plain wire, base	4.08c 19 10 0	2.39c to 2.83c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c 23 5 0	3.07c to 3.17c	7 17 6 to 8 2 6
Wire nails, base	3.87c 18 10 0	2.73c to 2.93c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.73 1 0 3	.....	.....

British ferromanganese $92.50 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d	French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$23.17 4 19 0(a)	$15.79	598	$16.90	500	$25.26 63
Basic bess. pig iron	21.65 4 12 6(a)	.....	...	.....	...	27.87 (b)69.50
Furnace coke	5.38 1 4 2	5.94	225	7.27	215	7.62 19
Billets	34.52 7 7 6	24.95	945	29.07	860	38.70 96.50
Standard rails	1.99c 9 10 0	1.39c	1,155	2.06c	1,375	2.38c 132
Merchant bars	2.42c 11 12 0††	1.44c	1,202	1.65c	1,100	1.98c 110
Structural shapes	2.17c 10 8 0††	1.41c	1,173	1.65c	1,100	1.93c 107
Plates, †¼-in. or 5 mm	2.20c 10 10 6††	1.82c	1,515	2.06c	1,375	2.29c 127
Sheets, black	3.08c 14 15 0§	2.17c	1,805‡	2.36c	1,575‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	3.61c 17 5 0	2.70c	2,250	4.13c	2,750	6.66c 370
Plain wire	4.08c 19 10 0	1.98c	1,650	2.48c	1,650	3.11c 173
Bands and strips	2.58c 12 7 0††	1.71c	1,340	1.95c	1,300	2.29c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 74.8 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	†12.00
Bos. dock No. 1 exp.	13.50-13.75
New Eng. del. No. 1	14.00
Buffalo, No. 1	13.75-14.25
Buffalo, No. 2	11.75-12.25
Chicago, No. 1	13.50-14.00
Chicago, auto, no alloy	12.00-12.50
Chicago, No. 2 auto	11.00-11.50
Cincinnati, dealers	11.50-12.00
Cleveland, No. 1	13.50-14.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	10.00-10.50
Detroit, No. 2	9.50-10.00
Detroit (industrial)	10.50-11.00
Eastern Pa., No. 1	15.00-15.50
Eastern Pa., No. 2	13.00-13.50
Federal, Ill.	12.00-12.50
Granite City, R. R.	12.75-13.75
Granite City, No. 2	12.00-12.50
Los Angeles, No. 1	12.50-13.00
Los Angeles, No. 2	11.50-12.00
N. Y. dock No. 1 exp.	12.00-12.50
Pitts., No. 1 (R. R.)	16.50-17.00
Pittsburgh, No. 1	15.50-16.00
Pittsburgh, No. 2	14.50-15.00
St. Louis, R. R.	13.00-13.50
St. Louis, No. 2	12.00-12.50
San Francisco, No. 1	12.00
Seattle, No. 1	14.00
Toronto, dirs. No. 1	10.00-11.00
Valleys, No. 1	15.00-15.50

COMPRESSED SHEETS

Buffalo	11.75-12.25
Chicago, factory	12.50-13.00
Chicago, dealer	11.50-12.00
Cincinnati, del.	11.00-11.50
Cleveland	13.00-13.50
Detroit	11.75-12.25
E. Pa., new mat.	15.50
E. Pa., old mat.	11.00-11.50
Los Angeles	12.50-13.00
Pittsburgh	15.50-16.00
St. Louis	10.00-10.50
Valleys	14.75-15.25

BUNDLED SHEETS

Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	11.00-11.50
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	14.50-15.00
St. Louis	7.50- 8.00
Toronto, dealers	4.00

SHEET CLIPPINGS, LOOSE

Chicago	8.50- 9.00
Cincinnati, dealers	7.00- 7.50
Detroit	8.50- 9.00
†Los Angeles	3.75- 4.00
St. Louis	7.00- 7.50

BUSHELING

Buffalo, No. 1	11.75-12.25
Chicago No. 1	12.50-13.00
Cincin., No. 1, deal.	8.00- 8.50
Cincinnati, No. 2	3.50- 4.00
Cleveland, No. 2	7.25- 7.75
Detroit, No. 1, new	10.00-10.50
Valleys, new, No. 1	14.25-14.75
Toronto, dealers	4.00

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	7.00- 7.50
Chicago	7.00- 7.50
Cincinnati, dealers	4.75- 5.25
Cleveland	7.00- 7.50
Detroit	5.75- 6.25
Eastern Pa.	9.00- 9.50
Los Angeles	4.50- 5.00
New York	†3.50- 4.00
Pittsburgh	9.50-10.00
St. Louis	3.00- 4.00
Toronto, dealers	4.25- 4.75
Valleys	9.00- 9.50

SHOVELING TURNINGS

Buffalo	7.50- 8.50
Cleveland	7.50- 8.00
Chicago	8.50- 9.00
Detroit	6.50- 7.00
Pitts., alloy-free	11.25-11.75

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	7.25- 7.75
Cincinnati, dealers	3.50- 4.00
Cleveland	7.50- 8.00
Eastern Pa.	6.50- 7.00
Detroit	5.75- 6.25
New York	†2.50- 3.00
Pittsburgh	8.25- 8.75
Toronto, dealers	3.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	13.00-13.50
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.00- 9.50
Toronto	5.00

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†6.00- 6.25
Buffalo	7.75- 8.25
Chicago	5.50- 6.00
Cincinnati, dealers	3.50- 4.00
Cleveland	7.25- 7.75
Detroit	5.75- 6.25
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	3.50

RAILROAD SPECIALTIES

Chicago	15.75-16.25

ANGLE BARS—STEEL

Chicago	15.50-16.00
St. Louis	14.00-14.50

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	17.00-17.50
Chicago, leaf	16.00-16.50
Eastern Pa.	17.00-17.50
Pittsburgh	17.25-17.75
St. Louis	15.00-15.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	15.50-16.00
Chicago (2 ft.)	16.75-17.25
Cincinnati, dealers	16.75-17.25
Detroit	16.50-17.00
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	17.75-18.25
St. Louis, 2 ft. & less	16.25-16.75

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	14.00-14.50
Cleveland	17.00-17.50
Pittsburgh	17.25-17.75
St. Louis	14.00-14.50
Seattle	16.00

FROGS, SWITCHES

Chicago	13.50-14.00
St. Louis, cut	14.25-14.75

ARCH BARS, TRANSOMS

St. Louis	14.00-14.50

PIPE AND FLUES

Chicago, net	9.50-10.00
Cincinnati, dealers	7.25-7.75

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	9.00- 9.50
Cincinnati, dealers	7.00- 7.50
Eastern Pa.	13.50-14.00
New York	†8.50- 9.00
St. Louis	9.50-10.00

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	15.50-16.00
St. Louis, No. 1	10.75-11.25
St. Louis, No. 2	12.50-13.00
Toronto, No. 1 dlr.	10.00

FORGE FLASHINGS

Boston district	†8.00- 8.25
Buffalo	11.75-12.25
Cleveland	11.50-12.00
Detroit	10.00-10.50
Los Angeles	9.00
Pittsburgh	14.50-15.00

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	16.50-17.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	18.75-19.25

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	16.00-16.50
Eastern Pa.	17.00-17.50
Pittsburgh	17.25-17.75
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.50-18.00
New York	†14.50-15.00
Eastern Pa.	17.00-17.50
St. Louis	18.00-18.50

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†16.00-16.50
Chicago, net	19.00-19.50
Eastern Pa.	21.50-22.50
St. Louis	19.00-19.50

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	13.50-14.00

SHAFTING

Boston district	†14.75-15.00
New York	†15.50-16.00
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾"	17.00-17.50

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	13.50-14.00
Chicago, rolled steel	15.50-16.00
Cincin., iron, deal.	13.50-14.00
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	17.00-17.50
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	17.25-17.75
St. Louis, iron	14.50-15.00
St. Louis, steel	15.00-15.50

NO. 1 CAST SCRAP

Birmingham	†12.50-13.00
Boston, No. 1 mach.	†10.75-11.00
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	10.50-11.00
Chicago, auto net	12.00-12.50
Chicago, railr'd net	11.00-11.50
Chicago, mach. net	12.00-12.50
Cincin., mach. deal	13.50-14.00
Cleveland, mach. net	16.75-17.25
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	14.50
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.25-15.75
San Francisco, del.	13.50-14.00
Seattle	12.00-14.50
St. Louis, cupola	12.50-13.00
St. Louis, agri. mach.	14.50-15.00
St. L., No. 1 mach.	15.00-15.50
Toronto, No. 1, mach., net	11.00-12.00

HEAVY CAST

Boston dist. break.	†10.75-11.00
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break, net	13.00-13.50
Detroit, auto net	13.00-13.50
Detroit, break	9.50-10.00
Eastern Pa.	15.50-16.00
Los Ang., auto, net	13.00-13.50
New York, break.	†11.50-12.00
Pittsburgh, break	13.25-13.75

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	13.00-13.50
Chicago, net	8.50- 9.00
Cincinnati, dealers	7.00- 7.50
Detroit, net	8.50- 9.00
Eastern Pa.	13.50
New York, fdy.	†10.00-10.50
St. Louis	9.00- 9.50
Toronto dealers, net	7.50- 8.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	15.00-15.50
Cincin., agri. deal.	12.00-12.50
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	15.00-15.50
Los Angeles	17.50-18.00
Pittsburgh, rail	14.25-14.75
St. Louis, R. R.	12.00-13.00

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbes.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbes.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.50-13.00
Swedish low phos.	12.50-13.00
Spanish No. Africa basic, 50 to 60% nom.	11.00
Tungsten. sh. ton. unit, duty pd. nom.	19.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	30.00-31.00
So. African, 50-52% nom.	30.00-31.00
Indian, 49-50%	29.00-30.00

Sheets, Strip

Sheet & Strip Prices, Pages 60 & 61

Pittsburgh—Despite recent gains sheet and strip production has yet to reach pre-holiday levels. Business is rising slowly, due largely to orders from miscellaneous users. Automotive buying is light but has helped to hold cold strip production better than other flat-rolled items. Output of common and full finished sheets has topped 55 per cent, with galvanized operations higher at slightly under 55. Hot strip production is around 45.

Cleveland—New business is heavier than a month ago, with further gains in sight. While most demand is for prompt delivery, some forward buying has appeared. Inventories of some consumers are large in relation to curent needs, a condition expected to be rectified within 30 days. Heavier automotive buying is not anticipated before the end of January.

Chicago — Flat-rolled sales are steady except for a slight gain in galvanized bookings. Production has tapered somewhat as final shipments are being made against last quarter's low-price tonnage.

Boston—With demand well diversified, cold strip activity is steady. Business is largely for prompt delivery. Secondary buying has appeared from some auto accessory makers. Rerollers still are operating principally on stocks acquired last quarter. Sheet business is lower in some instances, although tack makers are re-entering the market. An order for 67,000 pounds of formed stainless sheets for Lever Bros. went to American Rolling Mill Co., and will be fabricated further by Peterson & Neville, South Boston.

New York—Rising consumption shortly is expected to offset the lag in sheet buying occasioned by stock carryovers of some users. Housing work and domestic equipment manufacturing are counted on for heavier demand during coming months. Aqueduct for the Metropolitan Water commission, Boston, will require a large sheet tonnage. New orders for narrow cold strip from auto partsmakers accompany a well sustained demand from miscellaneous sources. Production still is slightly below the fourth quarter peak.

Philadelphia—Flat-rolled steel demand is expanding gradually. Auto releases are lighter. Radio and stove makers are fairly busy. Galvanized sheet demand for air-conditioning equipment is a bright spot.

Buffalo—Demand has leveled off at a fairly high rate, though buyers are covering only immediate needs. Automotive releases are somewhat restricted, while jobber inquiries lag.

Cincinnati — Sheet orders are lighter, this being reflected in lower production. Quieter automotive demand is seasonal, and mills anticipate early improvement in this business. Miscellaneous consumers are fairly active but are not buying ahead.

St. Louis — Prospective sheet business includes sizable tonnages to cover 1939 budgets of district railroads. Specifications are off slightly since early January, while new business consists principally of early needs of small users. Automotive strip releases are lighter.

Birmingham, Ala. — Output of sheets is being pushed to capacity, mills here and at Gadsden reporting uninterrupted production schedules because of a steady demand for roofing and manufacturers' sheets.

Plates

Plate Prices, Page 60

Cleveland—Slow but steady gains in plate inquiries point to more active demand soon. Purchases by local railroads for miscellaneous repairs are small, but requirements of industrial equipment builders are heavier. Prices are firm.

Chicago—A sizable amount of plate business is in prospect, a large share of which is for PWA projects. Freight car building is more promising, including 1000 box cars expected to be built or bought by the Union Pacific.

Boston—Releases from shipbuilders are steady and prospective tonnage is substantial. Water tank fabrication is quiet, while the oil industry generally is inactive. Orders from railroads and boiler shops are light. Some price shading continues.

New York—Outstanding inquiry involves 5000 tons for pipe to be furnished by Lock Joint Pipe Co. to Metropolitan Water commission, Boston. This company also is low on 23 miles of 24, 30 and 36-in. pipe for Bethlehem, Pa. Plate demand generally is spotty, but the railroad and oil industry outlook is improving.

Philadelphia—Alan Wood Steel Co. is reported low bidder on a large part of miscellaneous plate needs for several navy yards, bid Jan. 17. Low bidder on 8000 tons of pipe for Bethlehem, Pa., specified concrete, while 1000 tons of 42-inch pipe for Harrisburg still pends.

Birmingham, Ala. — Plate business, due largely to orders for railroad cars, has held up somewhat better than had been expected. Production is estimated at about 60 per cent, and there is some probability that schedule will be increased slightly if shipbuilding business in sight materializes.

Seattle—Largest tonnage pending totals more than 1000, including shapes, for the Puget Sound navy yard gate-caisson, to be placed within a few days by Winslow Marine Railway, Seattle. Coluccio & Macri, Seattle, are low at $152,401 for a unit of the Roza irrigation project, Washington state.

San Francisco—Consolidated Steel Corp., Los Angeles, is apparently low bidder on the Shoshone and Buck Springs Creek siphons. About 2000 tons will be required. Awards so far this year total 2670 tons, compared with only 77 tons for the same period last year.

Plate Contracts Placed

200 tons, 1,000,000-gallon tank, 40 x 110 feet, Brunswick, Me., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

180 tons, six tank, Gulf Oil Corp., Trenton, N. J., to Youngstown Boiler & Tank Co., Youngstown, O.

180 tons, six tanks, Gulf Oil Corp., Trenton, N. J., to Youngstown Boiler & Tank Co., Youngstown, O.

125 tons, 250,000-gallon elevated tank, Narragansett, R. I., to Chicago Bridge & Iron Co., Chicago.

100 tons or more, steel water tank, women's institution, Dallas, Tex., federal project, to Chicago Bridge & Iron Co., Chicago, $37,200; bids Dec. 28.

100 tons, 250,000-gallon elevated tank, Lawrence, Mass., to Chicago Bridge & Iron Co., Chicago.

Unstated tonnage, steel water tank, veterans' hospital, Dallas, Tex., to Chicago Bridge & Iron Co., Chicago, $13,440; bids Dec. 20.

Plate Contracts Pending

2000 tons, 10-foot 3-inch welded pipe, Shoshone siphon and Buck Springs Creek siphon, specification 814, Cody, Wyo; Consolidated Steel Corp., Los Angeles, low on schedule 1 and 2 and on combined bid at $212,100.

180 tons, including shapes, 140-foot motor tanker for Petroleum Navigation Co., Seattle; Commercial Iron Works, Portland, low.

173 tons, navy, bureau of yards and docks, Charleston, S. C., Central Iron & Steel Co., Harrisburg, Pa., low; schedule 5232.

Unstated, water tunnel intake, Bellingham, Wash.; bids Jan. 30.

Tin Plate

Tin Plate Prices, Page 60

Tin plate operations hold at 40 to 45 per cent, with most business involving general line can material and miscellaneous manufacturing needs. Some producers are stocking plate in preparation of packers' spring needs. Releases against such tonnage are expected to start late this month.

Bars

Bar Prices, Page 60

Pittsburgh—Bar business is disappointing, volume continuing below the early December level in both hot-rolled and cold-finished grades. Automotive buying is confined to small fill-in lots, while makers of some domestic appliances are slow to increase production. Few inquiries have appeared from farm implement builders, and little tonnage is on mill books.

Cleveland — Demand holds at about the rate a month ago. Auto partsmakers are seasonally less active, but specifications from farm and road equipment builders are heavier. Production is steady.

Boston—Demand for alloy bars has predominated the market lately, such orders being numerous although small. Forgers are buying in better volume, but merchant carbon bars are slow.

New York—Except for some stock replacement bar specifications show little change. Outlook for better demand in the aviation and machine tool industries is encouraging. Pick-up in railroad buying also is anticipated.

Philadelphia—Demand is tending upward slightly. Government buying continues an important factor, and a few odd lots have appeared from railroads.

Birmingham, Ala.—Bar business has started the new year at a satisfactory pace, most coming from agricultural implement manufacturers. Inquiry reveals some increase of production schedules over the past week, and output is estimated at around 65 per cent.

Buffalo—Bar mill schedules have been raised slightly, principally the result of better demand for reinforcing material. Little change has appeared in automotive needs.

Baltimore — Stock replacement has stimulated bar demand and sellers are optimistic over the outlook for rising consumption. Aircraft needs continue brisk, tool makers are more active and ship requirements are holding well. Railroad buying is dull.

Pipe

Pipe Prices, Page 61

Pittsburgh — Pipe activity is improving. Jobbers' shipments are better and this is reflected in mill orders. Some stocking is being done in anticipation of heavier business later this quarter. Mechanical tubing volume is lighter, automotive needs being off seasonally, while oil country business is less active than a month ago and boiler tubes and pressure tubing are quiet.

Cleveland — Jobbers' shipments of standard pipe continue to expand, with industrial repairs and extensions accounting for best demand. A date for bids on a substantial tonnage for Sandusky, O., has yet to be named. Cast pipe business is unchanged, but the outlook is encouraging.

Boston—Merchant pipe sales are gaining, largely because of building activity. Cast pipe, while still in fair demand, has quieted somewhat, and the district foundry has gone from five to a day-to-day week schedule. Composition pipe is becoming increasingly competitive with steel and cast iron for water service here.

New York—A spurt in pipe business is expected to follow settlement of the prolonged strike of plumbing supply truckmen. Line pipe is slow, but some fabricated pipe work is in prospect.

Birmingham, Ala.—Little change in production or demand for cast iron pipe is evident since December, which saw a rather marked tendency upward with scattered small orders. Production is on a four-days a week basis.

Seattle — No important tonnages are up for figures although several improvement projects are on engineers' boards. Present inquiries are for small lots of less than 100 tons each.

San Francisco—While activity in cast iron pipe is not pronounced awards so far this year exceed the aggregate for the same period in 1938. To date 847 tons have been booked, compared with 362 tons last year.

Cast Pipe Placed

1000 tons, 12-inch and under, Hamilton, Mass., to Warren Foundry & Pipe Co., Everett, Mass.
800 tons, 8, 12 and 16-inch, Portland, Me., water district, to Warren Foundry & Pipe Co., Everett, Mass.
700 tons, 30-inch, New Britain, Conn., to United States Pipe & Foundry Co., Burlington, N. J.
400 tons, 12-inch mostly, Lexington, Mass., to Warren Foundry & Pipe Co., Everett, Mass.
360 tons, 6, 8 and 12-inch, Newport, R. I., to Warren Foundry & Pipe Co., Everett, Mass.
200 tons, various sizes, Eugene, Oreg., Selah and Wapato, Wash., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

1000 tons, 36-inch, sewers, New Haven, Conn.; bids in.
900 tons, 54-inch and under, sewage disposal plant, Bowery Bay, New York; Tully & DiNapoli, Long Island City, N. Y., low.
800 tons, 4 and 6-inch Class 150, east bay municipal utility district, Oakland, Calif.; United States Pipe & Foundry Co., Burlington, N. J., low.
800 tons, 20-inch, sewer, Saugus, Mass., bids in; also 3000 feet, 22-inch steel pipe to be placed through contractor.
570 tons, 8 and 10-inch, Lincoln, Mass.; bids in.
290 tons, 30-inch, Brockton, Mass.
185 tons, 16-inch, Salem and Everett, Mass. through procurement division, treasury department, Boston.

Steel Pipe Pending

125 tons, copper-nickel alloy condenser tubes, navy, Mare Island; bids Feb 14, bureau of supplies and accounts, schedule 5437.
Unstated tonnage, 1150 feet, 36 and 48-inch o. d. steel pipe, collecting mains, McMillan filtered water reservoir, Washington; bids Jan. 31, United States engineer, Washington.

Wire

Wire Prices, Page 61

Pittsburgh—Demand is slightly better but still below December. Wire products markets have yet to quicken, jobbers being reluctant to build up stocks, although inventories generally are low. Lag in automotive demand is holding back the manufacturers' wire market somewhat, though business is well diversified.

Cleveland—Finishing mill operations remain about 60 per cent, with a slight gain over December indicated for January shipments. Manufacturers' wire demand is steady, while needs of jobbers serving agricultural centers are moderately heavier.

Chicago — Orders for wire and wire products are fairly heavy but disclose little change in the aggregate. Automotive demand, while still an importast factor, is lagging slightly.

Boston—Business is barely maintained on most products, with merchant products slower. The latter results from previous forward buying by secondary sellers at lower prices. Automotive suppliers have resumed ordering.

Baltimore — Merchant products specifications are heaviest for January in several years, reflecting previous active buying at concessions for delivery by Jan. 31. Low prices since have been withdrawn. Manufacturers' wire, without price influence, is improved slightly in demand.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 61

Bolt, nut and rivet demand has improved noticeably in the Middle West so far this month, but eastern

sellers note a lagging market. The latter report consumption better than anticipated, and with stocks receding inquiries are starting to increase. Business gains are coming principally from miscellaneous consumers, with railroad purchases for shop needs a factor. Heavier orders from warehouses to supplement low stocks are looked for soon.

Rails, Cars

Track Material Prices, Page 61

Railroad requirements are coming out slowly and in small lots. Court permission is being obtained by a number of roads in receivership, which will furnish tonnages later. Among the latter are Missouri Pacific 40,000 tons and Chicago, Rock Island & Pacific 45,000 tons of rails. Missouri Pacific has also been authorized to buy 1000 freight cars. Seaboard Air line has placed 8000 tons of rails.

Colorado Fuel & Iron Co., Denver, will start rail mill operations a week earlier than usual this year, having accumulated a backlog, with indications of better buying than in recent years. Rolling will start Jan. 25. The Pennsylvania will recondition and streamline 100 passenger cars at its shops at Altoona, Pa.

Car Orders Placed

Bureau of supplies and accounts, Washington, three flat cars, 60 tons capacity, to Haffner Thrall Co., Chicago.

Car Orders Pending

Denver & Rio Grande, 700 steel box cars.
John Morell & Co., Ottumwa, Iowa, 100 refrigerator cars; bids Jan. 30.
Missouri Pacific, 1000 freight cars; court permission granted.
Navy, two steel box cars, Greenville Steel Car Co., Greenville, Pa., low bidder, and one or two steel flat cars, Magor Car Corp., Passaic, N. J., low.
Union Pacific, 1000 to 2000 box cars; also some passenger equipment.

Locomotives Placed

Erie, two diesel locomotives, to Electro-Motive Corp., La Grange, Ill.
Fort Worth Belt Line, Fort Worth, Tex., one diesel, to Electro-Motive Corp., La Grange, Ill.

Rail Orders Placed

Seaboard Air Line, 8000 tons 100-pound rails, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.; unstated tonnage of accessories placed.
Spokane, Portland & Seattle, 4000 tons, to Colorado Fuel & Iron Corp., Denver.

Rail Orders Pending

Chicago, Rock Island & Pacific, 45,000 tons; purchase authorized.
Missouri Pacific, 40,000 tons; court permission granted.

Shapes

Structural Shape Prices, Page 60

New York—Structural contracting is quiet, but larger shops have good backlogs. Outstanding inquiry, 7500 tons for Delaware aqueduct tunnel supports, involves little fabrication. December bookings of fabricators were close to 170,000 tons, best 1938 month. Estimated bookings last year were 1,250,000 tons. STEEL's reports, covering only awards of 100 tons or more, totaled 1,088,521 tons, indicating complete coverage of larger projects.

Pittsburgh — Awards dropped slightly over the past week, although there was some gain in new projects. Placements are still almost entirely public works jobs, and only a few private inquiries have appeared.

Cleveland—Public work predominates awards, but private contracts are more numerous. Considerable tonnage for bridges in Cuyahoga county and also at Youngstown and Lorain, O., are expected out for bids soon.

Chicago — Structural awards are lighter, but the outlook is favorable in view of pending work. Principal bookings lately are for bridges.

Boston — Except for several hundred tons of I-beam spans, Vermont, bridge inquiry and contracts in New England are lacking. Most bridge work in Massachusetts is under contract, close to 15,000 tons placed with an estimated 1000 tons to be awarded. Fabricated steel prices continue soft and some work has gone around $68 a ton, delivered, recently.

Buffalo—A tentative slum clearance program here calls for three new housing projects to supplant 1600 dwellings to be razed. Many jobs are slow to appear for bids, and activity of fabricators is equally slow to expand.

Baltimore — About 24,000 tons of shapes, plus a substantial tonnage of concrete bars and piling, will be required for two Maryland bridges, substructures for which are active. One bridge is over the Susquehanna river at Havre de Grace, and the other over the Potomac. Fabricators in the Maryland-Virginia-Carolina district are operating close to 75 per cent, with backlogs fairly heavy.

Seattle — Pending work is larger than usual, but no important new projects have developed. The week's awards totaled 3160 tons.

Shape Awards Compared

	Tons
Week ended Jan. 21	**33,035**
Week ended Jan. 14	**27,885**
Week ended Jan. 7	**42,858**
This week, 1938	**23,094**
Weekly average, year, 1938	**21,566**
Weekly average, 1939	**34,593**
Weekly average, December	**30,283**
Total to date, 1938	**55,406**
Total to date, 1939	**103,778**

Includes awards of 100 tons or more.

Shape Contracts Placed

2850 tons, hospital building, Medical College of Virginia, Richmond, Va., to American Bridge Co., Pittsburgh.
2700 tons, unit 5 and 9, Lake Washington pontoon bridge, Seattle, to Pacific Car & Foundry Co., Seattle; Puget Construction Co., Seattle, general contractor.
1800 tons, technical school buildings, Chanute Field, Illinois, to American Bridge Co., Pittsburgh; through J. L. Simmons Co., Decatur, Ill.
1600 tons, group C buildings, state training school, Southbury, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; through A. E. Stephens Co., Springfield, Mass., also 140 tons of junior beams.
1535 tons, state office building, Frankfort, Ky., to International Steel Co., Evansville, Ind.
1500 tons, steel sheet piling, United States engineer, Providence, R. I., to Carnegie-Illinois Steel Corp., Pittsburgh.
1295 tons, bureau of reclamation, Grand Coulee, Wash., spec. 805, divided as follows: 555 tons, Kirby Steel Co.; 280 tons, Stearns-Rogers Co. and 460 tons, John W. Beam.
1200 tons, Arthur Hill high school, board of education, Saginaw, Mich., to Bethlehem Steel Co., Bethlehem, Pa.
1165 tons, piling, substructure Housatonic bridge, Stratford-Milford, Conn., to Carnegie-Illinois Steel Corp., Pittsburgh; through A. I. Savin Construction Co., Hartford.
905 tons, bridge, contract 447, Live Oak county, Texas, 770 tons, beam spans, to Mosher Steel Co., Dallas, 135 tons; truss span, to Virginia Bridge Co., Roanoke, Va.
900 tons, junior high school, board of education, Bloomfield, N. J., to F. G. Schaefer Iron Works, Edgewater, N. J.
800 tons, state viaduct, Minnesota avenue, Kansas City, Kans., to Kansas City Structural Steel Co., Kansas City.
715 tons, bridge, project 105-FAGM-69, Wyandotte county, Kansas, to Kansas City Structural Steel Co., Kansas City, Mo.
710 tons, State street subway contract S-5, Chicago, to Inland Steel Co., Chicago.
600 tons, supports for cracking and combustion cases, for Sun Oil Co. at Toledo, O. and Marcus Hook, Pa., to Bethlehem Steel Co., Bethlehem, Pa.
500 tons, sheet piling, bulkhead, Shark river, Belmar, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; through Gray Construction Co., Morristown, N. J.
500 tons, small bridges, flood repair work, Massachusetts, to American Bridge Co., Pittsburgh.
500 tons, bureau of reclamation, Crownover, Wash., spec. 810, to Treadwell Construction Co., Midland, Pa.
500 tons, prison hospital, Dannemora, N. Y., for state, to Bethlehem Steel Co., Bethlehem, Pa.
460 tons, head frames, guides, etc., Delaware aqueduct, contract 321, Carmel, N. Y., to American Bridge Co., Pittsburgh.

Behind the Scenes with STEEL

Up Pops the Devil

■ Perhaps our sense of humor is warped beyond all repair but the story about the old Indian with the perfect memory has kept us amused for days now. The story begins with a fellow telling the Devil about the old boy's feats of memory. He offers to let the Devil take his soul when he dies if he can catch our Indian friend in a mistake, and so it was agreed. The Devil thinks it over and decides to run out west and see the Indian, where he finds him lolling around beside his tepee. They talk things over at some length and the Devil finally asks, *"Do you like eggs?"*, to which the Indian replies, *"Ugh, likum eggs"*, and the Devil goes back to work. Some twenty years later the fellow dies and the Devil, seeing a nice fresh soul in prospect, pops up out of the ground and goes back out on the reservation to see the old Indian, who is still sitting there whittling away on an old stick. The Devil approaches him with a formal greeting and outstretched hand. *"How!"*, he says, and the Indian quick answers, *"Fried!"*

Hop On Your BUYcycle

■ 1939 will be a *BUY*cycle year, says the American Chain & Cable's house organ. The illustration shows "Advertising" and "Quality Products" as the two wheels, "Sales Effort" as the pedals and a "Go-Getter" pumping away for all he is worth. If the traffic cops don't get things all bawled up again we should be able to hop onto one of these new two-wheelers and have a swell ride.

'Way Back When

■ Erie, North Dakota, must be a marvelous place to live. By now they're just about through celebrating the armistice and will soon get a flash that Harding has been swept into office by a landslide. The prosperous 1920's are ahead for Erie and they have years before worrying about the depression setting in. We may be wrong about all this but last week we got a letter from one of the natives out there asking for a copy of the Iron Trade Review (STEEL's pappy). He mailed in one of our self-addressed envelopes last used right after the war. We hope the shock of our reply wasn't too much.

No Fiddlers

■ Prime example of the efficiency of steel company engineers was noted the other day in Pittsburgh when a gas explosion started a fire in the J&L Pittsburgh works. When newsmen at the plant tried to get to the telephone to get stories in for late editions, they found the lines all busy with engineers ordering parts for the machine which had been damaged, while outside the building firemen were still pumping water on the steaming walls. The machine was rebuilt and working again in 24 hours, almost before the ink was dry on the next morning's papers.

Two Winners

■"Whatta Whale", says Worth Steel on page 4 in a clever, attention-getting piece of copy, proving whatta whale of a lot you can do with a little different idea. And in a strikingly, simple way, Ohio Ferro Alloys stops you short with a beautiful action shot of a Bessemer converter on the page opposite.

Index Ready

■ If by chance you missed the little announcement on page 23, the index for STEEL, volume 123 is ready and willing. Drop the good old Readers Service Department a note and get yours.

—SHRDLU

—The Market Week—

460 tons, two sheds, Pier 41, Port of Seattle, to Columbia Steel Co.

430 tons, state highway bridge, Richfield, Kans., to Missouri Valley Bridge & Iron Co.

425 tons, building addition, Lever Bros., Cambridge, Mass., to New England Structural Co., Everett, Mass.; Stone & Webster, Boston, engineers and contractors.

410 tons, bridge R-78 and 79, Butler county, Pennsylvania, to American Bridge Co., Pittsburgh.

400 tons, pier 40, Seattle, Wash., to Columbia Steel Co., San Francisco.

400 tons, senior high school, board of education, Billings, Mont., to Bethlehem Steel Co., Bethlehem, Pa.

350 tons, bridge, project 61-65-1492-F, Morton county, Kansas, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

325 tons, dining hall, Texas A. & M. college, College Station, Tex., to Austin Bros.

325 tons, bridges, Route 6, Clifton, N. J., to American Bridge Co., Pittsburgh.

300 tons, sound stage for Universal Picture Co., Culver City, Calif., to Bethlehem Steel Co., Los Angeles.

265 tons, bridge FAP-806-E, Panola county, Texas, to Pittsburgs-Des Moines Steel Co., Pittsburgh.

250 tons, hospital building, Middletown, Conn., to Standard Structural Steel Co., Hartford, Conn.

250 tons, high school, Reading, Pa., to Reading Metalcraft Co., Reading.

245 tons, truss and beam spans. Mesa county, Colorado, to Midwest Steel & Iron Works Co., Denver.

240 tons, three beam spans, Lawrence, Mass., to American Bridge Co., Pittsburgh.

235 tons, stock barn, Louisiana State university, Baton Rouge, La., to Jones & Laughlin Steel Corp., Pittsburgh.

235 tons, telephone building, Alexandria Va., to Lehigh Structural Steel Co., Allentown, Pa.

225 tons, car-dumping trestle, Pennsylvania railroad, Sandusky, O., to Ingalls Iron Works, Birmingham.

220 tons, stock judging building, Michigan state college, Lansing, Mich., to Jarvis Engineering Works, Lansing, Mich.

215 tons, temporary structure over lock harbor, Gilbertsville dam, Tennessee valley authority, Knoxville, Tenn., to American Bridge Co., Pittsburgh, $18,-387.37; bids Dec. 22.

205 tons, senior high school, York, Pa., to A. B. Rote Co., Pittsburgh.

200 tons, hospital addition, Fort Monroe, Va., to Belmont Iron Works, Eddystone, Pa.; Virginia Engineering Co., Newport News, Va., general contractor. Virginia Steel Co., Richmond, awarded 50 tons, reinforcing steel.

200 tons, Convent Our Lady of Rosary, Bronx, N. Y. to Lehigh Structural Steel Co., Allentown, Pa.; through Daniel F. Walsh Inc., New York .

198 tons, Willert Park housing project, Buffalo, to Buffalo Structural Steel Co., Buffalo.

195 tons, high school, Mahanoy City, Pa., to American Bridge Co., Pittsburgh.

190 tons, bridge, project 96-87-1492-F, Sedgwick county, Kansas, to George C. Christopher & Son Iron Works, Wichita, Kan.

190 tons, I-beam bridges, Warren, Vershire and Woodstock, Vt., to American Bridge Co., Pittsburgh; Earle & Merry, Rutland, Vt.; Lockwood-Young Corp., Concord, N. H., and E. L. Knight, South Royalton, Vt., general contractors, bids Dec. 21 and 23, Montpelier, H. E. Sargent, commissioner of highways.

190 tons, high school, York, Pa. to A. B. Rote & Co., Lancaster, Pa. through I.

Reindollar & Son.

185 tons, addition, Webster school, Cambridge, Mass., to New England Structural Co., Everett, Mass.; M. Spinelli & Sons, Boston, general contractor.

180 tons, highway bridge No. 1220-F, Douglas county, Colorado, to Midwest Steel & Iron Works Co., Denver.

155 tons, highway bridge FAGM-605-A, Jackson county, North Carolina, to Southern Engineering Co., Charlotte, N. C.

150 tons, flood light towers, American league baseball park, Philadelphia, to Belmont Iron Works, Philadelphia.

150 tons, store, S. H. Kress Co., Greenville, Tex., to Mosher Steel Co., Dallas, Tex.

147 tons, school, Merick, N. Y., to Weatherly Steel Co., Weatherly, N. Y.

140 tons, Liberty tubes grade separation, Pittsburgh, for Allegheny county, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

140 tons, school, barracks and dispensary, Quantico, Va., to Fort Pitt Bridge Works, Pittsburgh; Charles H. Tompkins Co., Washington, general contractor; 250 tons, reinforcing bars, still pending.

130 tons, I-beam bridge, Bent county, Colorado, to Minneapolis-Moline Power Implement Co., Minneapolis.

125 tons, bridge 1759, Jackson county, Indiana, to American Bridge Co., Pittsburgh.

125 tons, state highway bridge, Willshire, O., to Burger Iron Co., Akron, O.

120 tons, Spring Garden elementary school, Pittsburgh, to Pittsburgh Bridge & Iron Co., Pittsburgh.

120 tons, shop building, University of California, Berkeley, to Bethlehem Steel Co., San Francisco.

115 tons, McCartney road bridge, Youngstown, O., to American Bridge Co., Pittsburgh.

110 tons, bridge R-35048, Lackawanna county, Pennsylvania, to American Bridge Co., Pittsburgh.

110 tons, bureau of reclamation, Calexico, Calif., spec. 144D, 85 tons to Pacific Iron & Steel Co., Los Angeles; 25 tons to Columbia Iron Works.

110 tons, high school, Erdenheim, Pa., to Frank M. Weaver, Landsdale, Pa., through Joseph R. Barrow, Philadelphia, contractor.

110 tons, East school, Lancaster, O., to C. E. Morris Co., Columbus, O.

105 tons, highway span 24-1501-E, Amite county, Mississippi, to Stupp Bros. Bridge & Iron Co., St. Louis.

Unstated tonnage, caisson, dry dock No. 4, navy yard, Puget Sound, Wash., to Winslow Marine Railway & Shipbuilding Co. Inc., Seattle, Wash., $389,650, bids Dec. 21, spec. 8969.

Unstated, steel towers for Bonneville power lines, to Lehigh Structural Steel Co., New York; by Bonneville authority, Portland.

Shape Contracts Pending

7500 tons, structural steel supports, contract 313, section of Rondout-West Branch tunnel, Delaware aqueduct, Wawarsing, Rochester and Gardiner, Ulster county, New York; bids Jan. 24 to board of water supply, New York; tunnel section 75,100 feet long with inside diameter 13½ feet; 75,000 linear feet, steel pipe up to 2½-inch, will be required for grouting.

2600 tons, piling, substructure, Maryland state bridge over Susquehanna river, Havre de Grace, bids Jan. 31; approximately 750 tons of bars also will be required; plans for the superstructure, which will require approximately 12,000 tons of shapes, are expected out in two weeks.

2500 tons, Triborough hospital, Jamaica, N. Y., for city of New York.

1500 tons, viaduct, Providence, R. I., bids on superstructure next month; preliminary contracts placed.

1000 tons, state training school and home, Southbury, Conn.

800 tons, state bridge, Montgomery county, New York; McLain Construction Co., Buffalo, low.

800 tons, grade elimination, Absecon, N. J.; new bids Jan. 13.

700 tons, high school addition, Richmond, N. Y., for board of education, New York.

700 tons, shapes and bars, school, Rahway, N. J.

600 tons, bascule bridge, Milwaukee, for city.

600 tons, factory and office building, Divco-Twin Truck Co., Macomb county, Michigan.

600 tons, additions, Cambridge high and Latin school, Cambridge, Mass.; bids Jan. 30; Charles R. Greco Inc., Boston, architect and engineer.

600 tons, over-crossing at Albany, Linn county, Oregon; bids Jan. 26.

400 tons, power plant, Greenhaven, N. Y., for state.

380 tons, Tremont health center, Bronx, N. Y.; A. J. Paretta Co., New York, low.

373 tons, steel plate girder bridge over Little Corodao river near Winslow, Ariz., in addition to 155 tons sheet piling; bids Jan. 27.

350 tons, auditorium and school, Middletown, Conn.

350 tons, student union building, East-

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ern state teachers college, Richmond, Ky.

345 tons, medium security penitentiary, Huttonsville, W. Va., for state.

325 tons, state highway bridge, Beaver county, Pennsylvania; bids Jan. 27.

278 tons, hangar for Oakland, Calif., airport; bids soon.

275 tons, Division street station, contract D-5, Chicago, for city.

258 tons, state highway bridge, Corinth, Miss.; bids closed Jan. 16.

250 tons, state college dormitories, Storrs, Conn.

200 tons, warehouse, United Wholesale Grocery, Canton, O.

200 tons, shop building, No. 44, Utica, N. Y., for state.

200 tons, male staff house, Norwich, Conn., for state.

200 tons, Ivydale bridge, Clay county, West Virginia.

200 tons, state normal school, Fredonia, N. Y.; bids postponed from Jan. 25 to March 2.

200 tons, Essex Retail Market, Manhattan, N. Y.; bids Jan. 25.

200 tons, real estate industrial building, West Forty-ninth street, New York.

200 tons, state viaduct, Ralston, Nebr.

175 tons, repairs to bridge 3450, Chicago, Rock Island & Pacific railway, Inner Grove, Minn.

175 tons, dispensary and barracks, United States navy, Quantico, Va.

175 tons, staff house, hospital, Norwich, Conn.

165 tons, state buildings D and E, Southbury, Conn.

160 tons, beam span, Mt. Clemens, Mich., for state.

155 tons, 118-foot 2-span I-beam bridge, Jamaica, Vt., and two I-beam bridges, each 79 feet, Irasville, Vt.; bids Jan. 27, H. E. Sargent, commissioner of highways, Montpelier, Vt.

150 tons, National Institute of Health, Bethesda, Md., treasury department.

150 tons, state bridge Orange county, New York; Lane Construction Co., Meriden, Conn., low.

150 tons, addition to Port Richmond high school, Staten Island, N. Y.; Lawrence J. Rice Co., Forest Hills, N. Y., low.

150 tons, supply storehouse, specification 8742, navy yard, Mare Island, Calif.; bids at Washington, Jan. 27.

140 tons, Central branch library, Jamaica, N. Y.; bids in, direct to procurement division.

135 tons, beam spans, Owosso, Mich., for state.

120 tons, dairy alterations, Suppiee-Wills-Jones Milk Co., Chambersburg, Pa.

115 tons, grade school, board of education, West Bend, Wis.

Unstated tonnage, requirements for substructure for Maryland state bridge over Potomac river, plans to be issued Jan. 24 with bids to be opened Feb. 14; the superstructure will be out for bids in a few weeks and will require approximately 12,000 tons.

Unstated, stop log guides and appurtenances, Spec. 1173-D, for Coulee pumping plant; bids to Denver Jan. 30.

Ferroalloys

Ferroalloy Prices, Page 62

New York—Ferroalloy prices are steady, following recent reductions in ferromanganese and some other manganese alloys. Domestic spiegeleisen is unchanged. Ferromanganese shipments are sustained at about the December rate.

Reinforcing

Reinforcing Bar Prices, Page 61

Pittsburgh — Prices have weakened perceptibly with several large jobs going at reduced prices, although firmness has been exhibited on a good many jobs. Tonnages now in the market still represent a substantial aggregate. Inquiries continue lighter than placements.

Cleveland — Awards increased last week, headed by 840 tons for a Youngstown housing project and 486 tons for a veterans' hospital here. Private work is more active. Fabricated prices continue weak.

Chicago—Pending tonnage continues heavy, though few inquiries or awards are for large lots. About 6000 tons remains to be placed for two sections of subway.

Boston — Prices still sag and efforts to strengthen quotations meet little success. Three contracts account for 1000 tons placed, and small-lot buying is active. New inquiry has declined. For a water aqueduct close to 15,000 tons of bars have been bought, the largest tonnage placed here in years.

New York—Orders and inquiries are lighter despite a large tonnage of prospective business. Sewage disposal plants pending will take nearly 2000 tons, while hospital buildings at Southbury, Conn., involve 1150 tons. Prices remain soft.

Philadelphia—Flood control work, for which a pending appropriation is $26,000,000, may take considerable bar tonnage. Few jobs are active, but a sizable volume is on drafting boards.

San Francisco — The reinforcing bar market was the most active one of the week and 4524 tons were placed, bringing the aggregate to date to 8485 tons, compared with 8468 tons a year ago. Bethlehem Steel Co. secured 2460 tons for the bureau of reclamation for delivery at Coram, Calif. Bids open Jan. 27 for about 2000 tons for a supply storehouse for Mare Island, Calif., specification 8742.

Concrete Bars Compared

	Tons
Week ended Jan. 21	**19,518**
Week ended Jan. 14	**15,290**
Week ended Jan. 7	**1,060**
This week, 1938	**1,798**
Weekly average, year, 1938	**6,959**
Weekly average, 1939	**11,956**
Weekly average, December	**8,973**
Total to date, 1938	**20,574**
Total to date, 1939	**35,868**

Includes awards of 100 tons or more.

Reinforcing Steel Awards

2460 tons, bureau of reclamation, invitation B-47,261-A, Coram, Calif., to Bethlehem Steel Co., Bethlehem, Pa.

1535 tons, sewage disposal plant, Bowery Bay, Queens, N. Y., to Jones & Laughlin Steel Corp., Pittsburgh; through Tully & Dinapoli, New York.

1000 tons, 1200-man barracks at Fort Lewis, Wash., to Northwest Steel Rolling Mills, Seattle; Ross B. Hammond, Portland, general contractor.

850 tons, unit of Coulee project, to Bethlehem Steel Co., San Francisco.

840 tons, federal government housing project, Youngstown, O., to Concrete Steel Co., Cleveland.

825 tons, flood wall, Kenova, W. Va., to West Virginia Rail Co., Huntington, W. Va. (sold direct; no contractor.)

600 tons, government housing project, Toledo, O., to Hausman Steel Co., Toledo.

520 tons, Pike county highway bridge, Waverly, O., to West Virginia Rail Co., Huntington, W. Va.; Purdy Construction Co., contractor.

500 tons, Arthur Hill high school, Saginaw, Mich., to Bethlehem Steel Co., Bethlehem, Pa.; through Bryant & Detwiler, Detroit, contractors.

500 tons, high school, Steubenville, O., to Bethlehem Steel Co., Bethlehem, Pa.; I. Barnes, Springfield, O., contractor.

477 tons, United States engineer, Huntington, W. Va., to Jones & Laughlin Steel Corp., Pittsburgh, at 2.08c, delivered; bids Jan. 3.

450 tons, north metropolitan sewer project, section 105, Everett-Medford, Mass, to Truscon Steel Co., Youngstown, O.; V. Barletta Co., Boston, general contractor.

425 tons, group C buildings, state training school, Southbury, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; through A. E. Stephens Co., Springfield, Mass.

400 tons, 375-man barracks, Fort Bragg, North Carolina, to Truscon Steel Co., Youngstown, O.; Charles W. Angle, Greensboro, N. C., general contractor.

400 tons, officers quarters, Scott field, Ill., to Truscon Steel Co., Youngstown; through Dickie Construction Co., St. Louis.

398 tons, water tank, Sacramento, Calif., to Bethlehem Steel Co., San Francisco.

375 tons, barracks, Fort Devens, Mass., to Truscon Steel Co., Youngstown, O.; J. Slotnick, Boston, general contractor.

370 tons, sewer for city of Cincinnati, to Joseph T. Ryerson & Son Inc., Cincinnati.

360 tons, mesh, highway project RC-4010, Delaware county, New York, to Bethlehem Steel Co., Bethlehem, Pa.; through Mohawk Paving Co. Inc., Buffalo.

350 tons, grade elimination, Saw Mill run boulevard and West Liberty avenue, Pittsburgh, to Jones & Laughlin Steel Corp., Pittsburgh; through Electric Welding Co. and Metzger-Richardson, Pittsburgh; Trimble Co., Pittsburgh, contractor.

350 tons, municipal garage, Cincinnati, to Truscon Steel Co., Youngstown, O.; Penker Construction Co., Cincinnati, contractor.

315 tons, bars and mesh, route 4 reloca-

tion, section 40, Englishtown road to Gordon's Corner, Monmouth county, New Jersey, to Igoe Bros., Newark, N. J.; Jannarone Contracting Co., Belleville, N. J., general contractor, $379,-664.32; bids Dec. 28.

310 tons, factory building, Thomas Laughlin Co., Portland, Me., and police station-municipal garage, Bangor, Me., to Bancroft & Martin Rolling Mills Co., Portland.

300 tons, hospital, Kalamazoo, Mich., to Calumet Steel Co., Chicago.

300 tons, Maplewood reservoir, East Orange, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; through Lafera-Grecco Contracting Co., Newark.

300 tons, sewer, Negley avenue, Pittsburgh, to Jones & Laughlin Steel Corp., Pittsburgh; through W. N. Dambach, Inc., Pittsburgh, Mike Manella, Pittsburgh, contractor.

285 tons, blocks 3 and 6, East End housing project, Louisville, Ky., to American Builders' Supply Co., Louisville.

250 tons, fire and police headquarters building, Providence, R. I., to Truscon Steel Co., Youngstown, O.; New Eng land Concrete Co., Providence, general contractor.

250 tons, substructure, bridge, Stratford-Milford, Conn., to Carnegie-Illinois Corp., Pittsburgh; through A. I. Savin Construction Co., Hartford, Conn.

250 tons, veterans hospital, barracks building No. 122, Wadsworth, Kans., to Ceco Steel Products Co., Kansas City, Mo.; through G. E. Stalker, Pittsburgh, Kans.

247 tons, press building, University of California, Berkeley, Calif., to Gunn, Carle & Co., San Francisco.

237 tons, mesh, highway project RC-4002, Sullivan county, New York, to Bethlehem Steel Co., Bethlehem, Pa.; through Thomas Progan, Yonkers, N. Y.

225 tons, Hanover Acres housing development, Allentown, Pa., to Bethlehem Steel Co., Bethlehem, Pa.; through Stoffiet & Tillotson, Philadelphia, contractors.

200 tons, approach, Main street bridge, Cleveland, to Republic Steel Corp.; through Patterson-Leitch Co., Cleveland, Lombardo Bros., Cleveland, general contractors.

200 tons, Willet Park housing development, Buffalo, to Bethlehem Steel Co., Bethlehem, Pa.; Fleisher Engineering & Construction Co., Buffalo, contractor.

195 tons, mesh, highway project, RC-2553, Suffolk county, New York, to Bethlehem Steel Co., Bethlehem, Pa.; through Gould & Kress Inc., New York.

177 tons, Rockford, Ill., junior high school building, to Calumet Steel Co., Chicago.

171 tons, bureau of reclamation, invitation 24,680-A, Blaisdell, Ariz., to Bethlehem Steel Co., Bethlehem, Pa.

165 tons, grade elimination, Ashburner street, Pennsylvania railroad, Philadelphia, to Jones & Laughlin Steel Corp., Pittsburgh, through Taylor-Davis Inc., Philadelphia; Yeo Construction Co., Chestnut Hill, Pa., contractor.

150 tons, hospital, naval academy, Baltimore, to Bethlehem Steel Co., Bethlehem, Pa.; John McShain, Philadelphia, contractor.

132 tons, bridge, Barrett's Ferry street, Williamsburg, Va., to Bethlehem Steel Co., Bethlehem, Pa.; through Hall-Hodges Inc., Norfolk, Va.

125 tons, extension of Kanawha boulevard, Court to Patrick streets, Charleston, W. Va., to West Virginia Rail Co.; Stellhorn & Beightler, Columbus, O., contractor.

123 tons, junior college buildings, Sacramento, Calif., to Truscon Steel Co., San Francisco.

110 tons, mesh and joists, soldiers' home, Rocky Hill, Conn., to Concrete Steel Co., New York; through F. H. McGraw & Co. Inc., Hartford.

108 tons, sewage pumping plant, Sacramento, Calif., to Gilmore Fabricators Inc., San Francisco.

104 tons, addition to Olympic garage, Sutter street, San Francisco, to Soule Steel Co., San Francisco.

104 tons, Lawton school, San Francisco, to Bethlehem Steel Co., San Francisco.

100 tons, buildings for state insane asylum, Manteno, Ill., to Calumet Steel Co., Chicago.

100 tons or more, additions, marine hospital, Memphis, Tenn., to Jones & Laughlin Steel Corp., Pittsburgh; A. Farnell Blair, Lake Charles, La., general contractor.

Reinforcing Steel Pending

2000 tons, supply storehouse, specification 8742, navy yard, Mare Island, Calif.; bids at Washington, Jan. 27.

1175 tons, hospital buildings, Southbury, Conn., A. E. Stephens Co., Springfield, Mass., general contractor for group C, 425 tons; groups D and E, closing Jan. 23 take 300 and 450 tons, respectively

1000 tons, substructure, bridge, Jamestown, R. I.; Merritt-Chapman & Scott, New London, Conn., general contractor.

750 tons, substructure, Maryland state bridge over Susquehanna river, Havre de Grace; bids Jan. 31; 2600 tons of steel piling also will be required; superstructure, requiring 12,000 tons of shapes will be out in a few weeks.

749 tons, three viaducts, between Lake street and Golden Gate bridge, San Francisco; bids Feb. 1.

480 tons, city hall, Port Huron, Mich.

475 tons, reservoir, Grand Rapids, Mich

425 tons, Weiler housing development, Toledo, O.

376 tons, sewer, Cincinnati; Joseph T. Ryerson & Sons Co., Chicago, low bidder.

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350 tons, apartment, Detroit.

300 tons, tunnel approach, Lincoln avenue, New York.

270 tons, grade elimination, Queens, N. Y., contract MC38-3; Nicholas DiMenna & Sons, New York, low.

210 tons, Nehalem river bridge, Clatsop county, Oregon; bids Jan. 26.

200 tons, electric plant, Mt. Pleasant, Mich.

200 tons, school, Gloucester, Mass.; readvertised for bids.

151 tons, over-crossing at Albany, Linn county, Oregon; bids Jan. 26.

150 tons, trade school, Springfield, Mass.; George H. Fuller Co., Boston, general contractor.

150 tons, Coney Island sewage extension, contract 2, Luang Construction Co., Brooklyn, low.

120 tons, Whitestone parkway project, New York; S. J. Groves & Son, Ridgefield, N. J., general contractor.

Unstated, four bridges and undercrossings, Oregon state projects; bids at Portland, Jan. 26.

Pig Iron

Pig Iron Prices, Page 62

Cleveland — Releases are better than expected, while some new business is appearing from consumers who underestimated requirements. Automotive foundries, while slightly less active, remain the largest consumers. Jobbing plants and heating equipment foundries are busier.

Chicago—Pig iron deliveries show definite improvement over the volume the second half of December and point to some gain for January as a whole. Gains in foundry operations are confined principally to larger interests. Coke deliveries the first half this month were 20 per cent larger than a month ago.

Boston—Gains in sales and shipments are slight, but the melt shows occasional betterment and the outlook is improved. Some jobbing foundries and textile mill equipment builders are more active, with stove plants in a seasonal slump. Stocks of small foundries are light, but some larger users have heavy inventories.

Philadelphia — Sales have increased the past few days, particularly from jobbing shops and malleable foundries. One textile machinery foundry is running five days a week. Pipe makers are more active.

New York—Miscellaneous carlots dominate new buying. Demand still is dull despite some inventory replacement. This applies to export as well as domestic business.

Buffalo—Shipments are slow to increase, but foundries report better inquiries for castings. The melt is gaining, a few plants working five days a week, and with inventories low a pickup in pig iron deliveries is looked for shortly.

St. Louis — Resumption at several stove plants chiefly is responsible for recent gains in the melt. Some jobbing foundries are busier. Pig iron shipments are ahead of the December average, but new orders are small, the largest being 450 tons. A slight gain in coke deliveries is indicated this month.

Cincinnati — Iron deliveries are heavier, a gain for January as a whole being indicated over December. Consumption has expanded with the reopening of the United States Pipe & Foundry Co. plant near here. New business is mostly small lots for prompt shipment.

Birmingham, Ala.—Some upward trend is evident in pig iron, both spot business and accompanying shipping instructions.

Toronto, Ont.—Sales are increasing and the melt is up about 10 per cent from the year-end low to 65 per cent of capacity. Pig iron production is steady, with five furnaces blowing.

Scrap

Scrap Prices, Page 64

Pittsburgh — Scrap prices continue strong but unchanged. Heavy buying in nearby districts and the active export market have reduced materially supplies of available scrap. Demand is not heavy, but some consumers are attempting to obtain a substantial quantity of open-hearth grades at current prices. Most tonnage is moving to down-river mills.

Cleveland—Republic Steel Corp. has bought 25,000 to 30,000 tons of scrap, principally No. 1 and No. 2 heavy melting steel. About half was for the Youngstown district, the balance for Buffalo and Chicago plants. Reported price paid for No. 1 steel at Youngstown was $16, a $1 increase over the recent market. The market here is firmer, but only routine shipments are being made.

Chicago—Light trading and long absence of mill inquiries make prices highly nominal though generally unchanged. Scrap traders find it difficult to place an exact valuation on No. 1 heavy melting steel, but concensus indicates the present range of $13.50 to $14 will stand until resumption of consumer buying clears the picture.

Boston — Buying is principally against old export orders. Prices are firm, particularly on larger lots of heavy melting steel. Shipments to eastern Pennsylvania are light.

New York—Steelworks are taking little heavy melting steel, but buying for export is active at unchanged prices. Small lots of breakable cast are moving to Pennsylvania points. An eastern Pennsylvania mill is taking 18,000 tons from wreckage of the Sixth Avenue elevated.

Philadelphia — Prices are firm, as indicated by a 25-cent advance by one mill to $15 for No. 1 steel purchased locally. This grade brought $16.25 on a recent Reading railroad offering of 1000 tons. One mill has reduced shipments of No. 2 steel.

Buffalo — Prices generally are nominal in the absence of new sales, but the market is steady despite lower bids by a leading consumer. Dealers still are making shipments against old orders.

Cincinnati—Scrap quotations are unchanged, but the market generally is dull. Mills are taking shipments while avoiding new commitments and inventory increases, and dealers are marking time.

Detroit—Prices of forge flashings and borings and turnings are up 25 cents, despite a generally quiet market. Some speculative buying is seen in higher prices bid on a recent list of Fisher Body bundles. Fisher now is offering scrap from its Cleveland plant instead of consigning it to a steelmaker on a yearly contract.

St. Louis—Scrap trading is dull, pending closing on inquiries from several mills for heavy melting steel. Prices range from steady to firm. Offerings by smaller dealers have moderated, but shipments continue heavy and railroads are offering more scrap than formerly.

Seattle — Higher ocean freight rates have made it more difficult for coast exporters to compete with Atlantic shippers for Japanese business. Credits continue tight, and the local market remains firm as tidewater stocks are low and shipments from the interior below normal. No. 1 steel for export is firm at $14.

Toronto, Ont.—Prices have flattened out, dealers offering the bottom of the spread rather than the top, but little tonnage is being offered. Some dealers are piling scrap at docks for boat shipment in the spring, while a few are preparing bundled sheets for immediate delivery to buyers around Pittsburgh.

Warehouse

Warehouse Prices, Page 63

Cleveland — Shipments are sustained, indicating a 10 to 15 per cent gain over December in January deliveries. Orders are widely scat-

tered as to consumers and products. Prices are firm.

Chicago — Demand is sustained, but a seasonal letdown is anticipated the remainder of January, followed by further gains the remainder of the quarter.

Boston—Settlement of the trucking strike has revived business somewhat, although sales have lagged so far this year.

New York—Sustained by a large number of small orders, volume is ahead of December for some jobbers, with demand well spread as to products.

Philadelphia — Sales are ahead of December and a year ago, both number and size of orders increasing the past week. Prices are steady, except on galvanized sheets.

Buffalo—Sales trends are mixed, with little change noted in the aggregate. Consumers are buying for only prompt needs.

Detroit—Business holds at about the December rate, but is moving ahead on a day-to-day basis. The immediate outlook is uncertain.

Cincinnati — Sales continue to rise, exceeding both December and January last year. Buying indicates low consumer inventories.

St. Louis — Demand still is gaining, and January business may exceed any 1938 month. River craft builders, railroads and oil well drillers are among the most active buyers.

Seattle — Sales volume continues on the same level as a month ago, small tonnages, with sheets in best demand.

Baltimore — December business was better than anticipated and January to date has been satisfactory. Building activity helps to provide a favorable first quarter outlook.

Iron Ore

Iron Ore Prices, Page 64

Cleveland—Consumption of Lake Superior iron ore during December was 3,040,700 gross tons, compared with 3,150,073 tons in November and 1,916,588 tons in December, 1937.

Stocks at lower lake ports and furnaces Jan. 1, 1939, were approximately 6,200,000 tons less than on the comparable date last year. Lake Superior Iron Ore association's report follows:

	Furnaces	Lake Erie docks	Total
Jan. 1, 1939	29,455,818	5,123,031	34,578,849
Month ago	32,166,031	5,290,294	37,456,325
Year ago	34,815,965	5,958,873	40,774,838

Baltimore — Arrival of 186,123 tons in December, according to complete figures now available, brought the total of iron ore imports here in 1938 up to 1,978,670 tons. December shipments compared with 176,199 tons in November and 220,050 in October, which latter was the largest monthly figure of the year. The second largest total in 1938 was 203,126 tons, in April. The December tonnage was the third largest for the year.

Manganese ore importations in December aggregated 34,250 tons and brought the total for the year up to 437,682 tons. The December figure compared with 38,800 tons in November and 54,099 tons in January which was the largest tonnage of the year.

There being no chrome ore arrivals in December, the total for the year remains at 107,171 tons. In November chrome ore importations amounted to 6617 tons, which compared with 16,527 tons in April, which was the largest monthly total of the year and 15,809 tons in March which was the second largest figure.

Ferromanganese importations showed a substantial increase over November. They comprised 4625 tons and 438 barrels and 78 cases, against 1600 tons in November and 200 tons in October.

Last month two shipments of magnesite came in, 9583 bags and 3086 bags, respectively, both from Trieste, Italy. A shipment of 7740 tons of ilmentite sand came in from Colachel.

Ferro Imports Light

Philadelphia—Steel and alloy importations here in the week ended Jan. 14 were featured by the arrival of 300 tons of ferromanganese from the Netherlands. Other arrivals included 14 tons of steel tubes, three tons of steel bars and three tons of steel billets, all from Sweden. No ore shipments were noted.

Steel in Europe

Foreign Steel Prices, Page 63

London — (*By Cable*) — Home office of Great Britain announces initial order for 120,000 tons of steel sheets, channels and accessories to build 400,000 air raid shelters. The order is spread over many works in the whole country. This is the first order placed under the government's defense scheme, which will cost £20,000,000, other orders to follow soon. Expected revival in the steel market is not yet apparent and dullnes prevails. Tin plate demand is moderate.

December imports were 52,299 tons, compared with 65,900 tons in November. Exports were 162,040, compared with 184,200 tons.

Agreement is reported between the British steel industry and motor car builders for a cut in the price of sheet steel, with provision for quantity rebates.

The Continent reports export trade dull with some Far Eastern inquiries being negotiated. Export prices for British Empire markets have been lowered.

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Nonferrous Metals

New York—Announcements that Anaconda Copper Mining Co. and Kennecott Copper Corp. were curtailing domestic production, coupled with reports that foreign producers were considering further restrictions on output, stiffened copper price sentiment last week. Prices remained steady here with tin fluctuating in a very narrow margin on light sales.

Copper—Anaconda has suspended operations at its large Leonard mine in Butte, Mont., while Utah Copper Co., a division of Kennecott, announced a 10 per cent curtailment in production. Export copper moved gradually higher to about 10.27½c, c.i.f. but demand was not active. Electrolytic held here at 11.25c, Connecticut.

Lead—Consumers refrained from buying more than carlots in view of their well covered position and the comparative low price level abroad. The domestic market held at 4.70c, East St. Louis.

Zinc—Prime western remained steady at 4.50c, East St. Louis. Anaconda announced the closing of two units of its Washoe plant in Montana, due mainly to the decline in ore receipts which followed the reduction in the tariff and the subsequent decline in slab zinc prices.

Tin—Sales declined but Straits spot held steady within the range of 46.50c and 46.70c. The trade has been somewhat disappointed that tin plate operations have not shown a larger increase since the first of the year.

Antimony—Prices were unchanged at 11.75c, New York, for American spot in cases. Demand was light.

Coke Oven By-Products

Coke By-Product Prices, Page 61

New York—Industrial demand for phenol has improved slightly, with prices unchanged. Jobber orders for naphthalene are also appearing in slightly better volume. Contracting for sulphate of ammonia for the January-June period is practically completed at $28 per ton, bulk, f.o.b. port. Shipments are expected to pick up seasonally late this month. Buying of distillates is well maintained with stocks held by both producers and consumers materially lower than several months back. This is notably true of toluol consumption, which is substantial by the lacquer trade.

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

Jan.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
14	11.25	11.37½	10.77½	46.65	46.80	4.85	4.70	4.50	20.00	11.75	35.00
16	11.25	11.37½	10.77½	46.50	46.65	4.85	4.70	4.50	20.00	11.75	35.00
17	11.25	11.37½	10.77½	46.50	46.65	4.85	4.70	4.50	20.00	11.75	35.00
18	11.25	11.37½	10.77½	46.70	46.85	4.85	4.70	4.50	20.00	11.75	35.00
19	11.25	11.37½	10.77½	46.50	46.65	4.85	4.70	4.50	20.00	11.75	35.00
20	11.25	11.37½	10.77½	46.50	46.65	4.85	4.70	4.50	20.00	11.75	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.25c Conn. copper

Sheets

Yellow brass (high)	17.31
Copper, hot rolled	19.37½
Lead, cut to jobbers	8.00
Zinc, 100 lb. base	9.75

Tubes

High yellow brass	20.06
Seamless copper	19.87½

Rods

High yellow brass	12.62
Copper, hot rolled	15.87½

Anodes

Copper, untrimmed	16.62½

Wire

Yellow brass (high)	17.56

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York	6.35-6.47½
Cleveland	6.75-7.00
Chicago	6.12½-6.37½
St. Louis	6.12½-6.37½

Heavy Copper and Wire

New York, No. 1	8.00-8.12½
Cleveland, No. 1	7.75-8.00
Chicago, No. 1	7.62½-7.87½
St. Louis	7.62½-7.87½

Composition Brass Borings

New York	5.50-5.75

Light Copper

New York	6.62½-6.87½
Cleveland	6.00-6.25
Chicago	6.00-6.25
St. Louis	6.12½-6.37½

Light Brass

Cleveland	3.50-3.75
Chicago	3.87½-4.12½
St. Louis	3.87½-4.12½

Lead

New York	4.00-4.25
Cleveland	3.50-3.75
Chicago	3.75-4.00
St. Louis	3.50-3.75

Zinc

New York	2.50-2.62½
Cleveland	2.00-2.25
St. Louis	2.25-2.50

Aluminum

Borings, Cleveland	5.75-6.00
Mixed, cast, Cleveland	6.75-7.00
Clips, soft, Cleveland	13.75-14.00
Mixed cast, St. Louis	7.00-7.50

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads	10.50
Standard No. 12 aluminum	12.75-13.25

Bills Propose $32,500,000 For Aircraft Construction

■ Senator Sheppard, Texas, chairman, senate military affairs committee, and Representative May, Kentucky, chairman, house military affairs committee, last week introduced identical bills for aircraft construction. A bill passed last year appropriated $2,000,000 per year, while the new bills call for $32,500,000, as suggested by the President's national defense message.

Carnegie Gives Obsolete Scottdale Plant to City

■ Carnegie-Illinois Steel Corp., Pittsburgh, has transferred title to its obsolete plant at Scottdale, Pa., to Scottdale Community Civic and Industrial association, a non-profit organization. Space will be leased to manufacturers, a portion having been taken by R. E. Uptegraff Mfg. Co., manufacturers of transformers and other electrical equipment.

This is a further step in the company policy to aid rehabilitation in communities where obsolete plants are located.

British Recovery Aided By Balanced Budget

■ Recovery from depression in Great Britain has been accomplished under a balanced national budget, while in the United States public debt has increased more than 100 per cent since 1929, according to the National Industrial Conference board.

A boom in building by private enterprise has been a factor. Real weekly earnings have been above the 1929 level throughout depression and recovery periods while in the United States this was the case only in 1936 and 1937. Unemployment has been less severe in the United Kingdom since 1932. The British government has reported a surplus every year except 1933, while in the United States the budget has not been balanced since 1930.

■New members in the metals section, National Safety council, Chicago, are American Cast Iron Pipe Co., Birmingham, Ala.; American Tool Works Co., Cincinnati; Apollo Steel Co., Apollo, Pa.; and Columbia Steel & Shafting Co., Carnegie, Pa.

Equipment

New York—Machine tool orders are few and scattered, the bulk of buying being done for government

shops. Some preliminary inquiries for 1939 equipment needs by the metal-working industry are appearing, but not in volume as yet. The airplane industry, one of the busiest, is expected to purchase additional equipment and some business is expected to materialize with the shipyards, also well booked with business. Most shipyards need metal-working tools. Considerable volume is held up temporarily at least and this includes a fair amount of equipment which has already been quoted.

Construction and Enterprise

Ohio

BRYAN, O. — Village, C. F. Hester, clerk, contemplates purchasing a 3000-horsepower diesel engine costing $150,000 with accessories for installation in its power plant.

CINCINNATI—Cincinnati Milling Machine Co. plans to install power equipment in new 100,000-square foot addition to its machine tool plant; cost estimated at $200.000. Carlton E. Brown, company engineer. (Noted Dec. 5.)

COLLEGE CORNER, O.—Village, John Pults, mayor, has revived plans to build a waterworks plant costing $67,-244. Includes pumping plant structure and water mains. Rial T. Parrish, Dayton, O., consulting engineer.

DAYTON, O. — Quartermaster corps, Wright field, plans to add to the generating capacity of its power plant by installing new equipment.

DAYTON, O. — Army air corps, materiel division, contracting officer, Wright field, takes bids to 10 a.m., Jan. 26, on 24 universal electric metal shears. (Circular 39-551.)

DAYTON, O.—Army air corps, materiel division, contracting officer, Wright field, takes bids until 10 a.m., Feb. 1 on a bench-type metal band-saw and a motor-driven hack saw (Circular 39-584); and on 1200 multiple series transformers (Circular 39-588).

GREEN SPRINGS, O. — Village, Ira Young, mayor, has plans for waterworks improvements costing $45,000. Consultant, Floyd Browne, Marion, O.

HOLGATE, O.—Village, C. F. Barth, clerk, is gathering data in regard to prospective construction of a municipal electric light and power plant.

NILES, O. — City, William Kearney, mayor, takes new bids to noon, Jan. 30, on contract No. 2 of underground electric system project costing $109,569. Contract includes cable, ducts, conduit, transformers and oil switches. Consulting engineer, A. H. Heindenreich, Hudson, O. (Noted Dec. 26.)

NORTH BALTIMORE, O. — Village, A. M. Lloyd, clerk, is awaiting PWA funds in connection with proposed construction of a sewage disposal plant costing about $80,000. Smith & Niles, Toledo, O., consulting engineers.

WAPAKONETA, O.—City, Louis Helpling, mayor, has completed plans for constructing a municipal light and power plant costing about $186,000. Consulting engineers, Burns & McDonnell, Kansas City, Mo.

WELLSTON, O. — City, J. L. Steel, mayor, takes bids due at noon, Jan. 27, on installation of piping, feed-water heater equipment, water softening equipment and control devices in municipal electric plant. Estimated cost $17,000. F. W. C. Bailey, Columbus, O., consulting engineer. (Noted Dec. 26.)

New Jersey

BELLEVILLE, N. J. — Andrew Jergens Co., 2535 Spring Grove street, Cincinnati, has plans for construction of a manufacturing plant to cost about $1,000,000.

Connecticut

HARTFORD, CONN. — Connecticut Light & Power Co. is making plans for expenditure of about $1,728,000 in extending and improving its power plants, substations, switching stations and transmission lines. Work is scheduled to get underway soon.

NEW HAVEN, CONN. — Armstrong Rubber Co. Inc. is building a one-story, 80 x 220-foot addition to its factory at estimated cost exceeding $40,000.

Massachusetts

CAMBRIDGE, MASS.—Simplex Wire & Cable Co. is constructing a one-story, 40 x 100-foot plant addition costing over $45,000 with equipment.

New York

LITTLE FALLS, N. Y.—Common council plans to construct a municipal power plant at cost of more than $150,000. Burns & McDonnell, Kansas City, Mo., consulting engineers.

LYONS, N. Y. — Hickok Mfg. Co., Rochester, N. Y., has let contract to Austin Co., Cleveland, for constructing a factory here at cost of approximately $60,000.

Pennsylvania

BUTLER, PA.—Borough probably will be ready for bids about Feb. 20 on contract No. 2, comprising pump station and gas engine generator, in construction of a sewage treatment plant costing $100,-000. Chester Engineers, Pittsburgh, consultants.

CLAIRTON, PA. — Pennsylvania Industrial Chemical Co., R. W. Ostermeyer, president, plans to install electric power equipment in connection with rebuilding portion of its plant recently destroyed by fire with loss estimated at more than $200,000.

READING, PA. — Textile Machine Works Inc., A. Hemmerich, general manager, is letting separate contracts for construction of a one-story, brick and steel addition to its plant, to cost in excess of $100,000.

Michigan

BATTLE CREEK, MICH. — City, T. Thorne, clerk, is taking bids due Feb. 19 on construction of waterworks pumping stations. Shoecraft, Drury & McNamee, Ann Arbor, Mich., consulting engineers.

Illinois

MACOMB, ILL. — McDonough Power co-operative, R. Grigsby, superintendent, takes bids soon on construction of 157 miles rural electric lines for which it has received $164,000 REA allotment. R. A. Donohue, Macomb, consultant.

Indiana

CORYDON, IND. — Harrison County Rural Electric Membership Corp., A. S. Miller, president, has a $387,000 REA allotment and will soon receive bids on 342 miles of electric distribution lines in two counties.

FT. WAYNE, IND.—Board of public works, R. G. Beams, chairman, will soon take bids on a sewage interceptor costing $241,557, and later on other interceptors and lift stations. C. Cole, Ft. Wayne, consulting engineer.

HAMMOND, IND.—Standard Railway Equipment Co. has awarded general contract to S. O. Strandberg, 37 West Van Buren street, Chicago, for constructing a two-story, 85 x 135-foot plant addition costing about $75,000.

District of Columbia

WASHINGTON — Navy department,

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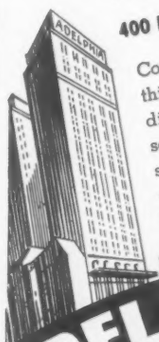

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yards and docks, is receiving bids on installing a pumping plant at its Puget Sound navy yard, Bremerton, Wash.

Georgia

DAHLONEGA, GA. — Southern Mining & Power Co. plans installation of a power plant in connection with constructing new mill and other buildings at local plant.

MOULTRIE, GA. — REA has allotted $125,000 to the Colquitt County Rural Electric Co. for constructing rural electric lines. Contract will be awarded soon.

UNION CITY, GA.—City, H. G. Cook, mayor, receives bids on construction of waterworks costing approximately $21,000. J. B. McCrary Co. Inc., Atlanta, Ga., consulting engineer.

Mississippi

CLARKSDALE, MISS.—City, T. M. Dye, mayor, receives bids Feb. 2 for two generating units consisting of steam boilers, stokers and auxiliary equipment, to be installed in municipal power plant. Stevens & Johnston, Starkville, Miss., engineers.

Tennessee

CHATTANOOGA, TENN.—Wesix Electric Heating Co., San Francisco, plans to establish a plant here for assembly of electric ranges and similar equipment.

CHATTANOOGA, TENN. — Electric Power board has completed plans and specifications for constructing overhead distribution lines costing $375,000.

Louisiana

BREAUX BRIDGE, LA.—City, W. R. Angelle, mayor, has $64,000 available and is starting work on a new gas system, with plans also underway for a new power plant and filtration plant.

LAKE CHARLES, LA.—Gulf States Utilities Co., John True, general manager, will begin work on a $150,000 plant and improvement of an electrical substation within 30 days.

West Virginia

RAVENSWOOD, W. VA.—Town, J. H. Williamson, recorder, is receiving bids for erection of power house, installation of water softening plant, well-drilling and two new gas generator sets. C. P. Fortney, Charleston, W. Va., consultant.

Virginia

STAUNTON, VA. — City receives bids Jan. 26 on Contract No. 2, including receptors, in a $175,000 sewerage construction project in which preliminary bids were rejected. Whitman, Requardt & Smith, Baltimore, consulting engineers.

Missouri

ANNAPOLIS, MO.—Black River Electric co-operative, Ray Brown, superintendent, is preparing plans for construction of 145 miles rural transmitting lines to cost approximately $100,000. E. T. Archer & Co., Kansas City, Mo., consulting engineers.

LANCASTER, MO. — Tri-county Electric Co-operative, Smith Powell, representative, has been allotted $344,000 by REA to construct 293 miles of electric lines serving customers in three counties.

ELLSINORE, MO.—Ozark Border Electric co-operative, P. G. Wingo, president, has awarded contract to R. B. Potashnick, Cape Girardeau, Mo., at $188,492 for construction of 253 miles rural lines. E. T. Archer & Co., Kansas City, Mo., consulting engineers. (Noted Dec. 26.)

Arkansas

CROSSETT, ARK. — Crossett-Watsek-Gates Industries Inc. has plans for constructing a paper mill and installing a power house with equipment, at total cost of about $700,000.

Wisconsin

WESTBY, WIS.—Vernon County Electric co-operative has plans underway for construction of a power plant to cost about $500,000. REA allotment approved.

Minnesota

BRAHAM, MINN.—Village, W. J. Olson, clerk, has WPA funds for construction of sewers and a complete sewage disposal plant to cost total of $85,000. Druar & Milinowski, St. Paul, consultants.

BRAINERD, MINN.—REA has allotted $306,000 loan to Crow Wing Co-operative Power & Light Co., D. W. Moir, superintendent, to finance construction of 232 miles rural transmission lines serving 939 consumers.

HALSTAD, MINN.—City, Anthony Opgrand, clerk, is making preliminary survey for construction of a municipal power plant and distribution system. G. M. Orr & Co., Minneapolis, engineers.

LANESBORO, MINN.—Village, A. O. Amdahl, clerk, receives bids to 10 a.m., Jan. 27, for construction of a sewage treating plant, sedimentation plant, trickling filter, chlorinator and sludge drying beds. Cost estimated at $113,670. Certified check 15 per cent to accompany bid. Toltz, King & Day, St. Paul, consulting engineers.

NEW ULM, MINN.—City, A. C. Sannwald, clerk, will have plans ready in March for bids on construction of projected trickling filter sewage disposal plant to cost $224,307. Carl W. Frank, city engineer. (Noted Dec. 26.)

PINE RIVER, MINN. — City, Arvid Lundin, clerk, plans a survey in the projected construction of an addition to its power plant, including generating equipment, wiring and switchgear. G. M. Orr & Co., Minneapolis, consultants.

ST. JAMES, MINN.—City, J. E. Cole, city engineer, contemplates installing filtration and softening equipment at its waterworks.

Texas

COMANCHE, TEX.—Comanche County Electric Co-operative association receives bids Jan. 27 for rural electric distribution system involving about 250 miles of lines. William Morrison, Waco, Tex., consultant.

North Dakota

KINDRED, N. DAK. — Cass County Electric co-operative, E. J. Morton, secretary, takes bids soon on construction of 110 miles rural transmission lines costing about $110,000. M. S. Hyland, Fargo, N. Dak., consulting engineer.

Nebraska

AUBURN, NEBR. — City is making plans to build a power plant and distribution system at estimated cost of about $342,000.

Iowa

BANCROFT, IOWA—Voters approved at Jan. 12 election city's proposal to build a municipal light and power plant at cost not exceeding $100,000. (Noted Jan. 9.)

MUSCATINE, IOWA—Board of water and light trustees, L. R. Henderson, chairman, takes bids to 7:30 p.m., Feb. 17, on construction of a water system for the municipal electric plant. Certified check 5 per cent to accompany bid. Young & Stanley, Muscatine, consultants.

PRIMGHAR, IOWA — O'Brien County Rural Electrification co-operative has awarded contract to John P. O'Neill Co., Faribault, Minn., for construction of 276 miles rural transmission lines costing $212,998.

SIBLEY, IOWA—City, E. H. Koopman, mayor, is receiving bids to 10 a.m., Feb. 8, for constructing an addition to municipal light plant. Includes installing 750-kilowatt turbo-generator, surface condenser, cooling tower and switchgear to cost about $151,462. Young & Stanley, Muscatine, Iowa, consulting engineers.

Wyoming

RIVERTON, WYO.—REA has approved allotment to Riverton Valley Electric association, N. W. Beckman, president, to finance construction of rural power lines totaling 91 miles.

New Mexico

PORTALIS, N. M.—Roosevelt County Electric Membership Corp. has plans which will mature soon for construction of 100 miles of rural electric lines at cost of $100,000. E. T. Archer & Co., Portalis, consulting engineers.

Utah

GARLAND, UTAH—Town has plans in progress for constructing a diesel light and power plant and electric distributing system at cost of $80,000. S. Margetts, Salt Lake City, Utah, is consulting engineer.

Pacific Coast

BAKERSFIELD, CALIF.—City, J. Holfelder, engineer, is completing plans for constructing a sewage treatment plant at cost of about $130,000.

LOS ANGELES—Certificate to conduct business as L & W Wire & Iron Products Co., at 2002 Barranca street, has been issued to owner Raymond Wells.

LOS ANGELES—Certificate to conduct business under firm name of Bevis Machinery Co., 4750 Santa Fe avenue, has been issued to the owner, D. G. Bevis.

LOS ANGELES—Peerless Pump Co. is preparing plans for constructing a one story, 41 x 204-foot addition to its office and factory building at cost of about $12,000.

SPOKANE—Washington Water Power Co. will spend $200,000 on expansion of its facilities, including new equipment in hydro-electric generating plants and power substations.

Canada

OTTAWA, ONT.—Department of national defense, W. R. Todd, director of contracts, is taking bids on production machinery costing about $100,000.

QUEBEC, QUE. — Province, S. A. Baulne, chairman, has plans for a hydroelectric development at Chibougamau with initial cost of $500,000. National Electric Syndicate, Quebec, engineer.

READER Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Coverage Is Thorough

To the Editor:

Your 1939 Yearbook of Industry has just come to my desk and I . . . shall read it thoroughly.

I think the format is excellent. The articles are well displayed and there is a wealth of information in this book. Naturally, it will take a while for me to read it all. Under Reader Comments, Mr. Jerome R. George's letter expresses my sentiments precisely on the subject of sharing of profits.

What pleases me most, however, is the very thorough way in which you have covered the industrial field under "The Rules Have Changed," "What's Ahead in 1939," "What's Ahead in Technical Progress" and your excellent editorials.

It is my wish that STEEL shall have the high degree of success that you so richly deserve.

THEO. MUNGEN
Manager Specialty Dept.,
Edward G. Budd Mfg. Co.,
Philadelphia

Comeback Was Prompt

To the Editor:

We found your annual issue very interesting and thought it was a very attractive and well arranged book. Your review of developments in the field in which we are particularly interested we thought was very well handled.

It is only on rare occasions that we get any comments which indicate that our advertising is being read. We were very much interested, therefore, when a Cleveland columnist devoted several paragraphs to a thought developed by his reading of our advertisement. We thought at first that he had reference to your editorial article on forging developments but later it was quite evident that it was the advertisement which caught his attention. Recently, too, we had a letter from the Rosenwald museum of science and industry in Chicago, asking where they could obtain a reproduction of the page from Nasmyth's sketchbook, which was used in this advertisement. We are forced to believe that STEEL does get around and if our advertisement got proportionately as much attention from those who should be interested in drop hammers as it did in these two cases, advertising does pay.

MACDONALD S. READ
Chief Engineer,
Erie Foundry Co.,
Erie, Pa.

Advertising Grows Better

To the Editor:

The Yearbook of Industry surpasses previous issues, in the writer's opinion. This not only applies to the editorial content, but there appears to be a decided improvement in the numerous advertisements. I often like to think that the activity of the N.I.A.A. has something to do with the improvement in industrial advertising. A majority of folks are getting away from the idea that a display advertisement with their signatures at the bottom will suffice. Industrial advertisers, generally, today are placing more facts and practical information in the pages of space they use.

We believe that the Yearbook issue of STEEL is an outstanding example of this trend.

W. J. RAMSEY
Advertising Manager,
Mathews Conveyer Co.,
Ellwood City, Pa.

Impressed by Yearbook

To the Editor:

I took the Yearbook of Industry home and went through part of it and expect to go through the whole book.

I might say that I was very much impressed with this number and feel that you have done a good piece of work in publishing this Yearbook. It contains not only a lot of good advertising, but a considerable amount of interesting comment, figures, etc., which is all useful information.

I am glad to add my favorable comments for this good piece of work.

WILLARD S. HARING
Vice President Sales,
Alan Wood Steel Co.,
Conshohocken, Pa.

Always Read STEEL

To the Editor:

I want to offer to you my compliments for a very fine Yearbook. We are also glad to have a page in this issue and feel that it will do us a great deal of good.

Our entire organization always reads STEEL with a great deal of interest.

J. C. COTNER
General Manager,
Logansport Machine Inc.,
Logansport, Ind.

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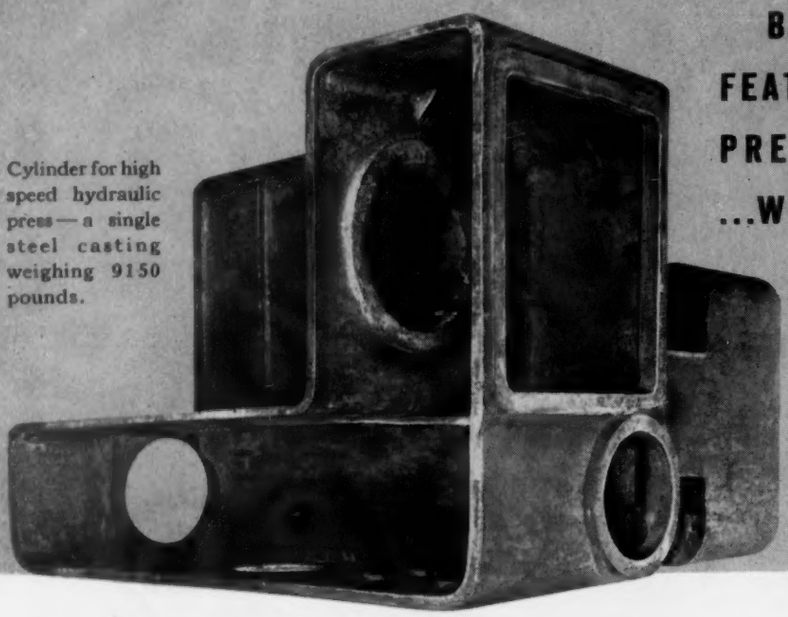
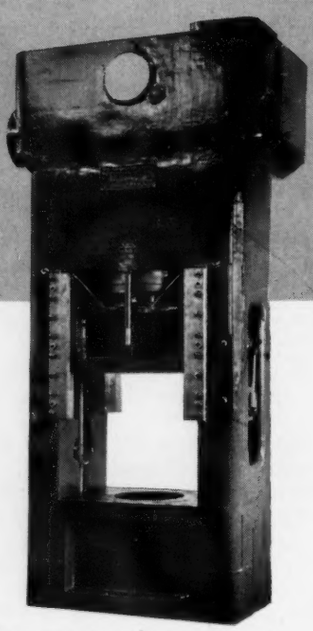


Cylinder for high speed hydraulic press — a single steel casting weighing 9150 pounds.

This cast steel cylinder for a hydraulic press, made for The French Oil Mill Machinery Co., of Piqua, Ohio, brings the manufacturer many worth-while advantages.

They say "With Steel Castings, we get strength without excess weight, minimum deflection, greater rigidity, dense pressure-tight structure, and freedom from pockets, inclusions and shrinkage stresses.

"We have eliminated many parts, and our presses have longer, fatigue-free life."



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5. High rigidity, minimum deflection, accurate alignment, close tolerances and better fit.
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7. High fatigue resistance, maximum endurance and longer life — ideal for critically stressed parts.

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